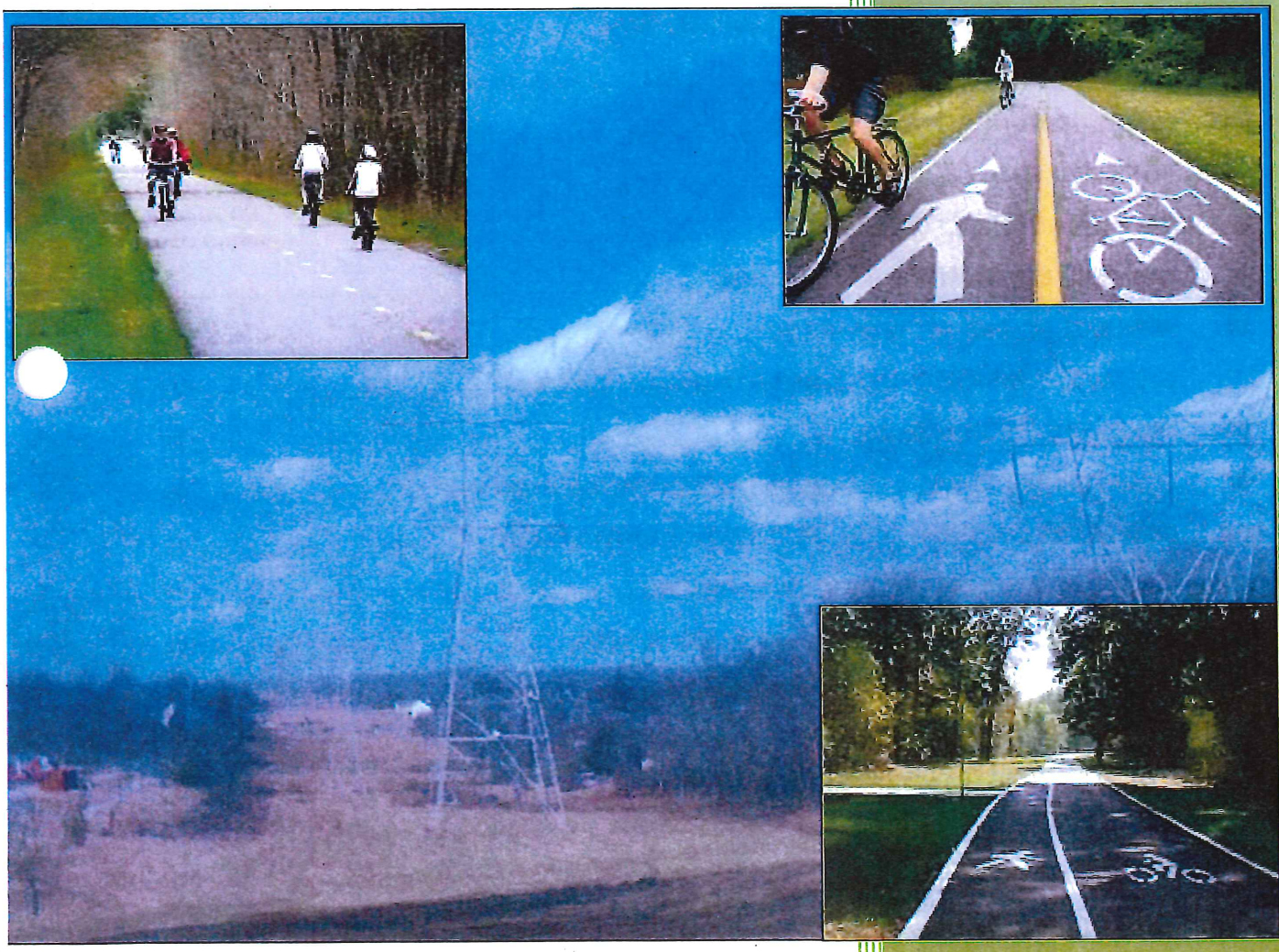
Bike Howard

Bicycle Master Plan
Howard County, Maryland

Field Assessments for Select Trail Corridors



Prepared by:

Vision Engineering and Planning

June, 2013

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I. INTRODUCTION

In support of the development of Bike Howard, the Howard County Bicycle Master Plan, Vision Engineering and Planning, LLC has been tasked with conducting field visits to trail corridors, potential trail corridors, and areas where off-street connections are needed as a component of the overall Plan. The locations and/or corridors investigated were among those that were not studied in the recent Columbia Association (CA) pathways plan, however they may be connected to or directly related to CA pathways or other proposed trails. The inventory consisted of evaluating field conditions to determine if the construction of shared-use paths might be feasible given the terrain, right-of-way, and environmental conditions. In consultation with County staff, Toole Design Group (TDG) selected the following locations for Vision Engineering and Planning to review:

- Ellicott City Area
- Dorsey's Search
- Long Reach Area
- Oakland Mills Area
- Lake Elkhorn/Snowden River Parkway Area
- Oakland Ridge Area
- Maple Lawn-North Laurel Area
- Potential route to APL
- Eden Brook Drive to APL
- Mayfield to Distant Rock Path
- Gateway Commerce to Columbia Pathway System
- Route MD 175 Underpass
- Connection to Disc Golf Course at Rockburn Branch
- Power Line Corridor Parallel to Montgomery Road
- Road Conditions on Long Gate Parkway
- Trail Through Waterloo Elementary School

- Short Cut Between Snowden River Parkway and Existing Pedestrian/Bicycle Tunnel Under MD 175
- Connection to Lowes Shopping Center

II. ELLICOTT CITY AREA

In the Ellicott City area, an extension of the Little Patuxent Trail from Larkspring Row, north to Bethany Lane was investigated.

Field review: The field review began near Cypressmede Park and continued to Larkspring Row. The terrain south of Frederick Road is level, and construction of a path adjacent to the stream bed is feasible. Directly north of Frederick Road, the terrain is steeper, and there is a small stream that would require a structure to cross.

Stream bed north of Frederick Road

Blue River Ct

Would require easement for access

The terrain on the west side of the stream bed is much steeper south of Frederick Road making it difficult to add proposed neighborhood connections on that side of the proposed path.

Consultation with staff at Howard County Department of Recreation and Parks: Consultation with Howard County Department of Recreation and Parks indicated that they had no plans for additional paths in this area.

Review Topography in GIS, property boundaries (parcels) and land cover/natural resource designation, including public ownership: The land cover along the corridor is forested with clear areas near the stream bed. No private lots traverse the corridor; however the stream bed passes through one private parcel associated with the Enchanted Forest shopping area. Given that the path is proposed on the north side of the stream bed, there would be no conflicts with this parcel.

Check the potential connecting points to the neighborhood as mapped by TDG: The access point to the proposed trail at Larkspring Row would require an easement at a private residence. This is also the case for connections at Blue River Court, Gray Rock Drive, and Horned Owl Court.

The grades on the west side of the stream bed preclude connections to Grosvenor Drive and Arjay Circle. Grades are also steep near the proposed connection to Plum Meadow Drive.

Would require easement for access to public library

The Plum Meadow Drive connections could be built if an easement is purchased near one of the private residences. This is an important connection between the neighborhood and the public library located on Frederick Road.

The connection to Elmmede Road would not require an easement and is feasible to construct with minimal grading.

Assess the prospects for crossing Route 40: A crossing over Route 40 would require the construction of a pedestrian/bicycle bridge. The Route 40 bridge over the stream is too narrow to construct a bike path under the bridge, adjacent

to the stream. Constructing a pedestrian bridge at this location would require significant amounts of fill on both sides of US 40 to provide the proper approach grades. An at-grade crossing is the most feasible option to cross Route 40. However, given the high speeds and traffic volumes along Route 40, and the fact that it would create a new mid-block crossing, special treatments would be needed to ensure the safety of bicyclists.

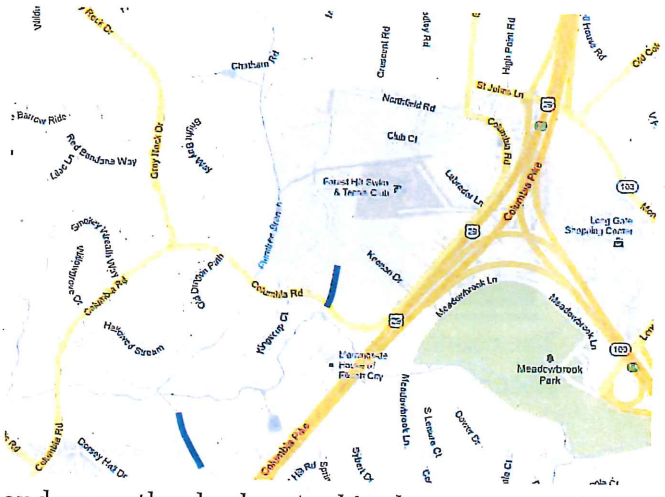
Determine if there are issues at Fredrick Road crossing point: The Frederick Road crossing has adequate sight distance for bicyclists, however, the bridge railing on Frederick Road reduces the visibility of motorists, particularly given the height of bicyclists, so this is another location where specialized treatment may be required for the crossing.

Summary of Recommendations:

- Construct connections on the east side of stream bed
- Evaluate signalized bicycle crossing at US 40
- Purchase easements as necessary to provide connections, particularly to key destinations such as the public library

III. DORSEY'S SEARCH

An extension of the Plumtree Branch trail from Columbia Road to the existing path leading to the Dunloggin MS and Northfield ES was investigated.



Field Review: This alignment is feasible and is located along an existing utility easement. The field review indicated that the proposed connections are feasible with relatively level terrain and no wetlands observed in the area. A review of

the existing paths crossing Brightbay Way and connecting to Wild Filly Court indicated that they do not have ramps for easy bicycle access.

Consultation with Howard County Recreation and Parks: Consultation with DRP staff indicated that there are plans for connections between the Village of Dorsey's Search and the east side of US 29 and south of MD 108.

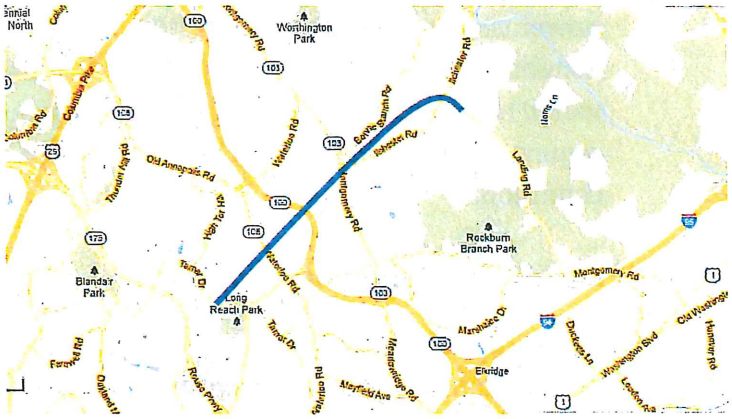
Review Topography in GIS, property boundaries (parcels) and land cover/natural resource designation, including public ownership: There are no private parcels located on the proposed alignments. The area is forested with some clearing near the stream bed.

Summary of Recommendations:

- Construct extension of the Plumtree Branch trail from Columbia Road to the existing path leading to the Dunloggin MS and Northfield ES

IV. LONG REACH AREA

The use of a major north-south powerline corridor in the county from Tamar Drive, north to Bonnie Branch Road, Ilchester Road, and Talbot's Landing was investigated for the potential use as bicycle trail.



Field Review: The field review indicated that this corridor is suitable for a bicycle path, with existing gravel paths located along the corridor for service vehicles. The terrain is rolling throughout the corridor with no steep grades observed. Field evidence indicated that the power lines are owned by BGE.

Review Topography in GIS, property boundaries (parcels), streams and wetlands, and land cover: The power line corridor is completely cleared, and no public parcels are located on the corridor.

Check the potential connecting points to the neighborhood: Connections to existing neighborhoods would require coordination with BGE and private residences to obtain an easement.

Assess the prospects for crossing Route 100: Crossing over MD 100 would require the construction of a pedestrian/bicycle bridge over MD 100 which would require significant amounts of fill and the reconfiguration of sound walls along MD 100. There is no existing bridge/overpass on MD 100 at the power line crossing, which precludes crossing under MD 100, and crossing at-grade is not an option as MD 100 is a limited access facility. The field review indicated that the nearest crossing of MD 100 is located at Waterloo Road (MD 104), west of the proposed path. This would require deviating from the power line easement to Waterloo Road (MD 108) south of MD 100(northwest of the intersection of MD 108 at Brothers Partnership Court), using MD 108 and the MD 104 crossing at Route 100 to cross MD 100 before connecting back to the power easement north of Route 100 using a combination of residential streets including Elko Drive, E Glen Road, and Heatherland Court where an easement would be required to connect back to the power line corridor. This would require restriping all of these facilities which is feasible given the observed field conditions.

Summary of Recommendations:

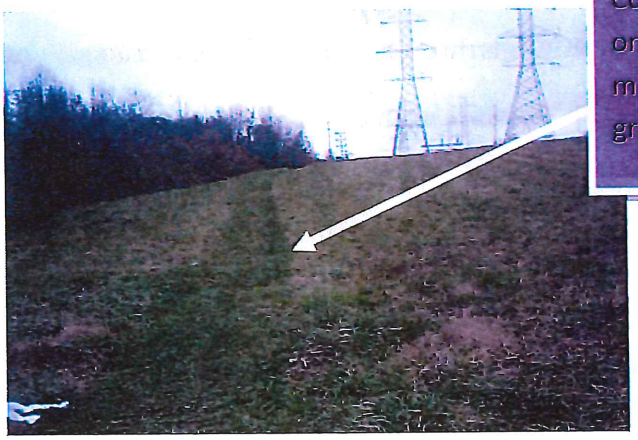
- Construct path along power line corridor and use existing Waterloo Road overpass to cross MD 100

V. OAKLAND MILLS AREA

Vision also investigated the use of an existing

utility corridor for a trail to link east-west from the trail in the Sewell's Orchard area to the west to the proposed Little Patuxent Trail at Broken Land Parkway and Stevens Forest Road. This trail is proposed to go on the new sewer line, running north south from Kings Contrivance to Downtown Columbia.

Field review: The field review indicated some relatively steep grades in the Sewell Orchard area; however the existing bike paths in this area where constructed at an angle to reduce the uphill grade for bicyclists. This approach would be required to construct additional paths in this area. The remaining corridor is relatively level with an existing gravel path being used by access vehicles.



Review topography in GIS, and land cover/natural resource designation: A review of the topography and GIS land parcels indicated that the power lines are on reserved right of way and do not cross any private parcels. The land cover is grassy along the entire corridor.

Determine if it's a utility or public ROW: Field evidence indicated that the lines are owned by BGE. Discussion with County Engineering staff indicated that utility coordination for design projects, including bicycle paths is initiated by contacting Miss Utility at 1-800-257-7777. Miss Utility will then coordinate with the appropriate utilities to identify lines along a particular study corridor.

Check the potential connecting points to the neighborhood as mapped by TDG: A field review of the area indicated that connections to existing neighborhoods along the proposed path are feasible. In fact, several, de facto paths were observed between some of the neighborhoods and the proposed path, so there appears to be even greater opportunities to connect to neighborhoods along this alignment.

Review Topography in GIS, property boundaries (parcels) and land cover/natural resource designation, including public ownership: Field

evidence indicated that the lines are owned by BGE. There are no private parcels located on the proposed line, [nor in immediate vicinity.]

Summary of Recommendations:

- Construct path between Sewell Orchard's area and Stevens Forest Road
- Construct path on angle in Sewell Orchard's area to overcome steep grades
- Construct all proposed neighborhood connections
- Explore additional neighborhood connections based on existing foot paths in area

VI. LAKE ELKHORN/SNOWDEN RIVER PARKWAY AREA

Vision investigated the potential to use parking lots, streets and a trail link across the powerline corridor to link Minstrel Way with Deepage Dr.

Field review: The field review indicated that the utility easement is suitable in this location for a bicycle path. The crossing of Carved Stone should not be problematic, as traffic volumes were observed to be very low on this road with adequate sight distance in both directions. The portion of the proposed path connecting to Minstrel Way is located behind an existing gas station, and there is limited space to construct a path at this location (< 15').

Determine which utility owns the ROW: Field evidence indicated that the lines are owned by BGE.

Review Topography in GIS, property boundaries (parcels) and land cover: There are no private parcels located on the utility line, and the utility line has

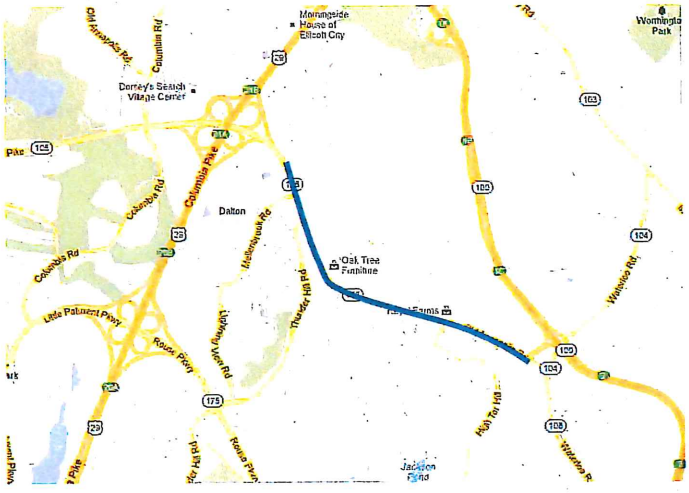
been completely cleared. Private parcels are located on the connection between the utility easement and Minstrel Way.

Summary of Recommendations:

- Construct path between Minstrel Way and Deepage Drive
- Stripe bicycle lane on existing parking lot behind gas station

VII. OAKLAND RIDGE AREA

Vision researched the ownership of the Oil Pipeline Corridor on the south side of Route 108 (Annapolis Road) from Mellenbrook Road to Waterloo Road.



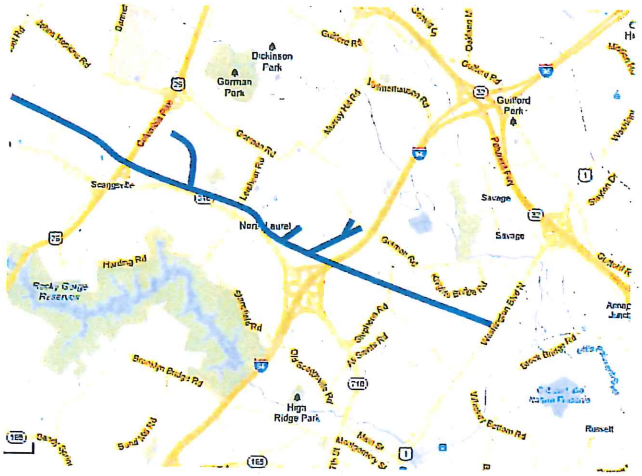
Field review: The field review indicated that there is potential right of way located adjacent to MD 108 for a bike path. There are currently no planned improvements to Route 108 in this section. As Built plans obtained from Colonial Gas Pipeline indicated that there is a gas pipeline easement on the north side of MD 108 that overlaps the existing MSHA Right-of-Way and CA property. The centerline of the easement is roughly 40' from the edge of pavement, but is closer at intersections where MD 108 has been widened. The easement is roughly 20' in width and crosses MD 108 west of Phelps Luck Drive and continues on the south side of MD 108 to US 29. On the south side of MD 108, the easement is much closer to the edge of the pavement (4-6'). However, the Right-of-Way in this area extends 85' from the centerline of MD 108, giving ample flexibility for the construction of bicycle paths in this corridor.

Summary of Recommendations:

- Construct path along MD 108 between Mellenbrook Road and Waterloo Road
- Contact Noah Dobbins at CenturyLink (703)-464-7529 to coordinate future bicycle path construction with Colonial Gas Pipeline

VIII. MAPLE LAWN-NORTH LAUREL AREA

The east-west powerline corridor from Pindell School Road to Route 1 was investigated for the possible construction of a bike path. This corridor roughly parallels MD 216.



Field review: The field review indicated the western and eastern portions of the corridor are suitable for a bicycle path, specifically from Route 1 to I-95 and from Scaggsville to US 29. The section of the proposed path east of Leishear Road currently has a

no trespassing sign which precludes public access. There are also wetlands near Crest Road which pose another potential barrier along this proposed path.

Review Topography in GIS, property boundaries (parcels), streams and wetlands, and land cover: The utility easement has been completely cleared; the connection to Hammond Parkway is wooded. The utility easement crosses several private parcels near Leishear Road.

Check the potential connecting points to the neighborhood as mapped by TDG: The connections to Skylark Boulevard and Upper Sky Way would require traversing steep grades along the stream bed; however, the field review indicated that the paths could be constructed along an angle to the stream bed which would reduce the grades to an acceptable level.

Assess the prospects for crossing US 29, and I-95: The most significant barriers in this corridor are US 29 and I-95, neither of which have existing overpasses that could be utilized by the proposed path to cross under. As they are both limited access facilities, crossing US 29 and I-95 would require the construction of overpasses. Constructing an overpass at US 29 would require some fill (5-10') to develop the approach grades required for a bicycle bridge. The I-95 overpass would require significantly more fill to construct an overpass as the existing grades in the area of the proposed path are greater than 10' below I-95. There are no overhead utility conflicts to prevent the construction of a bridge, but given the amount of truck traffic on both facilities, a clearance of 25' is recommended for any bridge construction.

Hammond Branch stream corridor, from Hammond Park to Hammond Parkway: The connection to Hammond Parkway would be difficult and expensive to construct as there are steep grades located along the stream bed south of Hammond Parkway.

Assess the prospects for leaving the corridor to connect to Skylark Blvd. and surrounding neighborhood and using Gorman Road to Stevens Road and back to the corridor: Gorman Road has shoulders that could be utilized for bicycle lanes between Skylark Boulevard and Stephens Road. The County is also planning to improve Gorman Road which would offer an excellent opportunity to introduce bike lanes along this corridor.

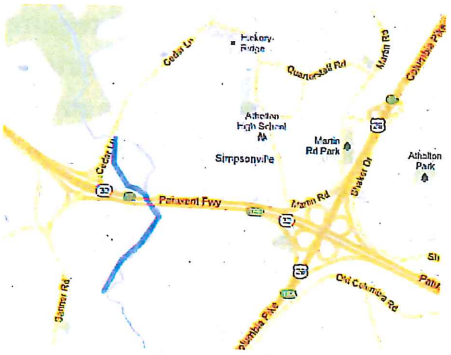
Assess neighborhood connectivity in the following areas; Maple Lawn, Hammond Park, Skylark area, North Laurel area: Connections to these areas are all feasible, though it would be difficult to provide a direct connection to Hammond Parkway and Hammond Drive because of the steep grades in this area.

Summary of Recommendations:

- Construct path between Pindell School Road and I-95
- Construct bicycle/pedestrian bridge at US 29
- Use existing Gorman Road overpass to cross I-95
- Construct connections to Skylark Boulevard and Upper Sky Way
- Construct connection to Stephens Road

IX. POTENTIAL ROUTE TO APL

This route would connect Cedar Lane north of MD 32 (near the Robinson Nature Center) to APL.



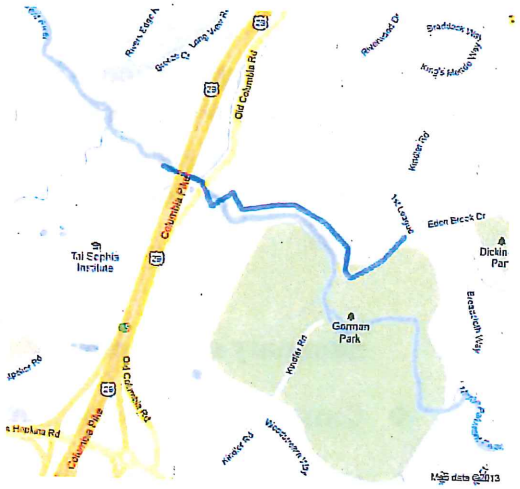
Field Review: The field review indicated that the MD 32 overpass over the Middle Patuxent River has sufficient vertical and horizontal clearance for a bike path to be constructed at this location. An alignment near the stream bed would be suitable as the terrain is relatively level with some clear areas near the stream bed.

Summary of Recommendations:

- Construct path between Cedar Lane and APL
- Use existing MD 32 overpass to cross MD 32

X. EDEN BROOK DRIVE TO APL

A connection between Eden Brook Drive and APL was investigated, particularly the crossing at US 29.



Field Review: The connection between Eden Brook Drive and APL would require using the existing US 29 overpass over the Middle Patuxent River. While the overpass on US 29 provides adequate vertical and horizontal clearance for a bicycle path, the Old Columbia Road overpass over the Middle Patuxent River has limited vertical and horizontal clearance which would preclude constructing a path under Old Columbia Road; however, the path could deviate from the stream bed at Old Columbia Road, and an at grade crossing could be constructed there. Old Columbia Road was observed to have low traffic volumes and sufficient sight distance which would make an at-grade crossing feasible.

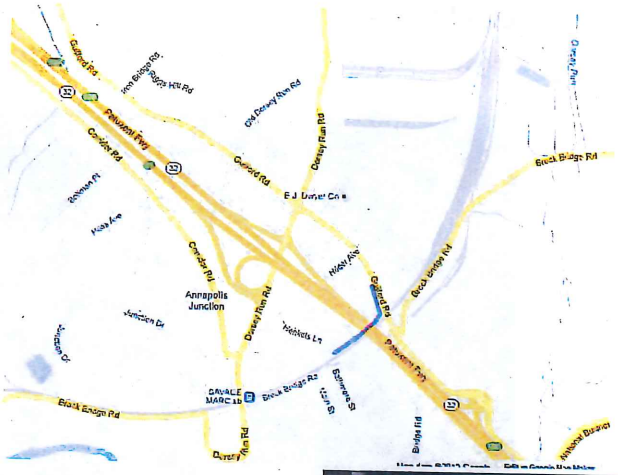
Old Columbia Rd Overpass

Summary of Recommendations:

- Construct path from Eden Brook Drive to APL
- Use existing US 29 overpass to cross US 29
- Sign/Stripe at-grade crossing at Old Columbia Road

XI. LINK GUILFORD ROAD TO HENKELS LANE

The link between Guilford Road and Henkels Lane would connect the Savage MARC station to the industrial parks north of MD 32. The proposed path would parallel the existing MARC commuter rail line under MD 32.



Field Review: The field investigation indicated that the bike path could be constructed under the existing MD 32 overpass as there is a buffer between the active rail lines and the location where the bike bath would be located.

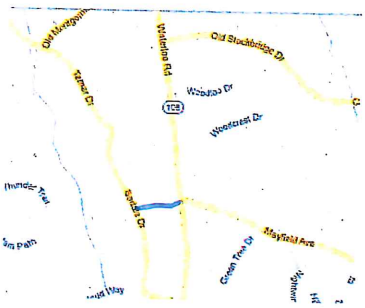
Locate bicycle path near bridge supports of MD 32 overpass

Summary of Recommendations:

- Construct path between Guilford Road and Henkels Lane

XII. MAYFIELD TO DISTANT ROCK PATH

Field Review: The field investigation indicated that this would be an ideal location to construct a bicycle path. It could not be determined from the field review if the Columbia Association owned this right of way.



Summary of Recommendations:

- Construct path between Mayfield Avenue and Distant Rock Path

XIII. GATEWAY COMMERCE TO COLUMBIA PATHWAY SYSTEM

This trail would parallel MD 108 and cross MD 175 before connecting to the existing Columbia Pathway System.

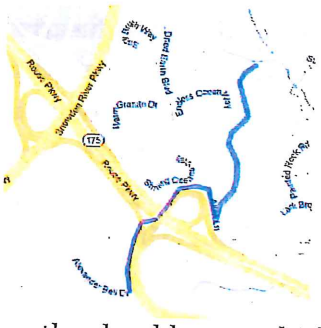
Field Review: The field investigation indicated that the area is clear and a bicycle path could be easily constructed between John McAdams Drive and MD 175. The key to this connection is providing a safe crossing across MD 175 which could be accomplished with improved markings and pedestrian/bicycle signal timing and phasing adjustments at the intersection of MD 175 and MD 108. Passive detection technologies (microwave, etc.) could be implemented which would improve the detection rates for bicycles and pedestrians at the intersection.

Summary of Recommendations:

- Construct path between Gateway Commerce and Columbia Pathway System
- Improve intersection of MD 175 at MD 108 to accommodate bicycles

XIV. ROUTE MD 175 UNDERPASS

Field Review: The existing underpass under MD 175 to Columbia Gateway Drive could be used for a bicycle path.



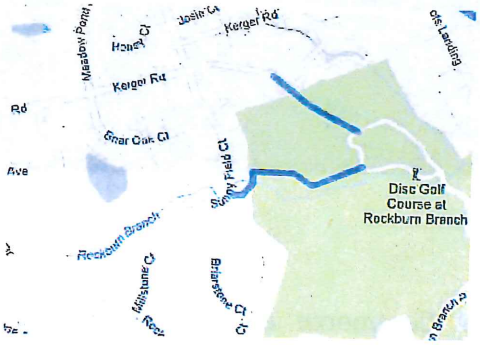
However it is recommended that the roadway be restriped to provide a larger buffer for bicyclists on the shoulder as vehicle speeds were observed to be over 40 mph at this location.

Summary of Recommendations:

- Construct path under MD 175 to Columbia Gateway Drive
- Restripe underpass to provide buffer for bicyclists

XV. CONNECTIONS TO DISC GOLF COURSE AT ROCKBURN BRANCH

Field Review: The connections to Disc Golf Course at Rockburn Branch would be difficult to implement in the field. There is a private fence separating the golf course from the subdivision and the northernmost connection would require the use of a private driveway which is not suitable for bicycle path.

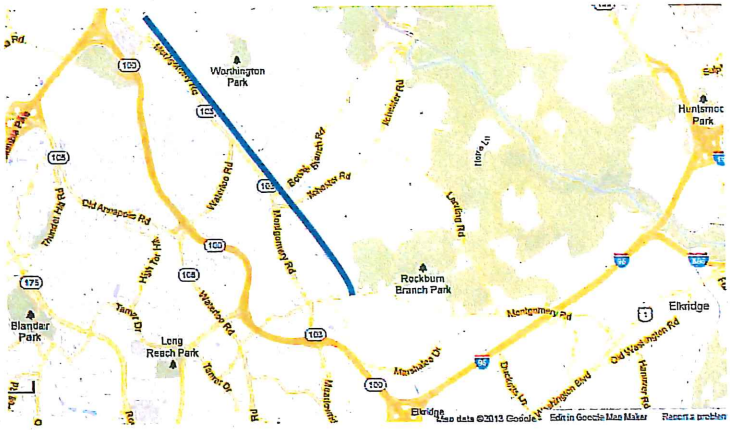


Summary of Recommendations:

- Do not construct connections to Disc Golf Course at Rockburn Branch

XVI. POWER LINE CORRIDOR PARALLEL TO MONTGOMERY ROAD

Field Review: The field investigation indicated that this would be an ideal location to construct a bicycle path. The terrain is generally rolling with reasonable grades observed along the

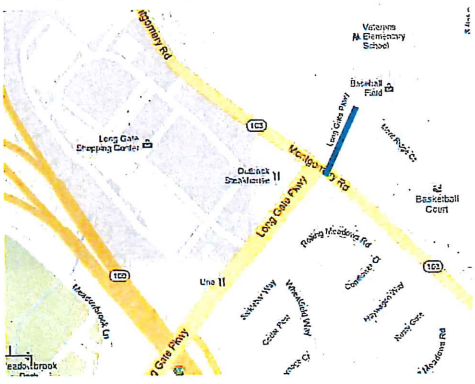


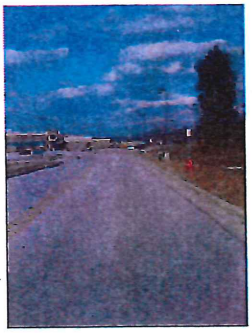
Summary of Recommendations:

- Construct path along power line corridor parallel to Montgomery Road

XVII. ROAD CONDITIONS ON LONG GATE PARKWAY

Field Review: The field investigation indicated that this location would be a suitable location to construct a bicycle path. There were reasonable grades observed along Long Gate Parkway, and bicycle lanes could be added with minimal striping.



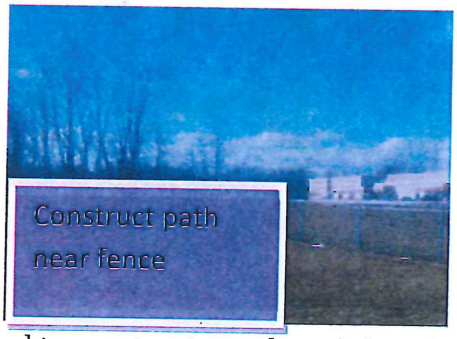


Summary of Recommendations:

- Stripe bicycle path along Long Gate Parkway

XVIII. TRAIL THROUGH WATERLOO ELEMENTARY SCHOOL

Field Review: The field investigation indicated that the existing paths are in reasonable condition for bicyclists and pedestrians. A review of the Waterloo Elementary School site indicated that the best way to route



a bike path would be around the periphery of the school grounds as there is ample level ground to construct a path, and this would also help minimize any potential security issues the school may have with locating a bicycle path on the school grounds.

Summary of Recommendations:

- Construct path through Waterloo Elementary School

XIX. SHORT CUT BETWEEN SNOWDEN RIVER PARKWAY AND EXISTING PEDESTRIAN/BICYCLE TUNNEL UNDER MD 175

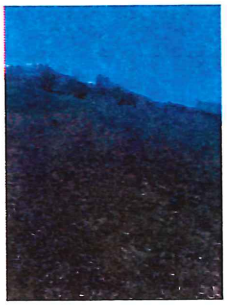
Field Review: The field investigation indicated that this connection is feasible and desirable as it would connect Long Reach Park with Long Reach High School and the Long Reach shopping center. The terrain is level and an informal footpath was observed between Long Reach Park and Long Reach High School indicating pedestrians are using this location already.

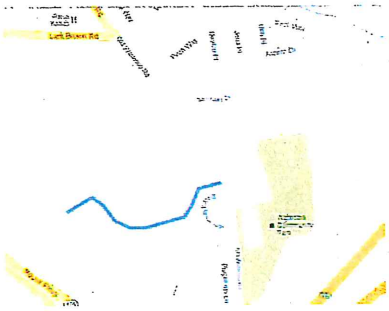
Summary of Recommendations:

- Construct path between Snowden River Parkway and existing bicycle/pedestrian tunnel under MD 175

XX. CONNECTION TO LOWES SHOPPING CENTER

Field Review: The field investigation indicated that this location would be difficult to construct a bicycle path. The shopping center site is elevated above the surrounding area, leading to significant grades which would make it difficult if not impossible for bicyclists to climb.





Summary of Recommendations:

- The grades are too steep at this location to construct a path

APPENDIX C

Plans Reviewed

Bicycle Policy & Design Guidelines: Maryland State Highway Administration, Draft. State Highway Administration. April 2013.

Bike Course. TriColumbia.

Chip Seal 2012 List. Howard County Department of Public Works. July 12, 2012.

Connecting Columbia: Active Transportation Action Agenda. Columbia Association. September 20, 2012.

Construction Plans. Annapolis Junction Town Center, LLC. January 2013.

The Mall Neighborhood: Downtown Columbia Neighborhood Concept Plan. Howard County. May 16, 2012.

Green Infrastructure Network, Draft. Howard County.

Highway Needs Inventory. Howard County-Primary. Revised 2011.

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Howard County: Pedestrian/Bicycles Element Comprehensive Transportation Plan. The Howard County Department of Planning and Zoning. July 1996.

Howard Transit System Map. Howard County. July 2010.

Letter from Howard County Internal Memorandum to Land Development Division, RE: Annapolis Junction Town Center (Savage TOD)-SDP 13-048. Date: March 4, 2013.

Letter from Howard County Office of Executive to Maryland Department of Transportation, RE: "Major Capital Projects". FY 2013-2018 Consolidated Transportation Program. Date: May 24, 2012.

Letter from State Highway Administration to HC Division of Land Development RE: Shipley's Grant Project. March 23, 2007

Map of Existing and Proposed Columbia Bikeways, Howard County Department of Public Works, provided by Mark DeLuca.

Maryland Historic National Road. Corridor Partnership Plan Update, Draft. January 2013.

Master Plan Draft. Blandair Park. October 10, 2008.

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Queue Sheets of Recreational Bicycle Routes in Western Howard County, provided by Chris Tsien and other cyclists, 2012

Roadway Plan. Howard County Department of Public Works RE: Oakland Mills Road Improvements Capital Project J-4207. June 2011

Simpson Mill Development Proposal. Howard County Department of Planning and Zoning. 2013.

Snowden River Parkway Road Improvement Plans, i.e. engineering drawings (Broken Land Parkway to Oakland Mills Road), Howard County Department of Public Works, provided by the Department of Planning and Zoning, 2012.

Tentative Road Repair List-FY13. Howard County Department of Public Works. June 15, 2012.

Tentative Resurfacing List-FY13. Howard County Department of Public Works. June 15, 2012.

US 1 Corridor Improvement Strategy. Howard County. February 2008.

Warfield neighborhood Design Guidelines: Downtown Columbia. The Howard Hughes Corporation. January 2012.

APPENDIX D

Key Destinations for Network Development and Future Signed Route System

During the public involvement phases of the plan development process, important destinations were identified. The purpose of this task was to confirm where today's bicyclists and prospective bicyclists want to go by bike. Initially, a list of ~40 destinations was created, and in subsequent planning work with County staff and the Technical Advisory Group, the list grew to 51.

These Key Destinations were used in the prioritization and screening process to create the Short Term and Mid-Term Networks.

They can be used again at a future date when developing a network of signed bicycle routes. When developing a signed bicycle route system, an early task is to identify a logical set of destinations that the system will serve, and thus refer to on the sign panels. A standard approach is to develop three classes of destinations; primary, secondary and tertiary.

- Primary destinations will include those that serve as route endpoints and other destinations of major importance or of the greatest interest to existing and prospective bicyclists.
- Secondary destinations will include those of less importance and many that are along the various routes, but not at their endpoints.
- Tertiary destinations typically include important destinations that may be located a short distance away from a major route, or are of lowest level of importance.

Key Destinations

The destinations are organized by region. V.C. stands for Village Center.

Eastern Howard County (8)

- BWI Trail (AA County)
- Dorsey MARC Station
- Elkridge
- Grist Mill Trail
- Ilchester
- Rockburn Branch Park
- St. Denis MARC Station (Baltimore County)
- Wholesale Food Center

Southern Howard County (9)

- JHU-Applied Physics Lab
- Laurel (Prince George's County)
- Laurel MARC Station (Prince George's County)
- Maple Lawn
- North Laurel
- NSA/ Ft. Meade (Anne Arundel County)
- Patuxent Branch Trail
- Savage
- Savage MARC Station

Northern Howard County/Ellicott City (10)

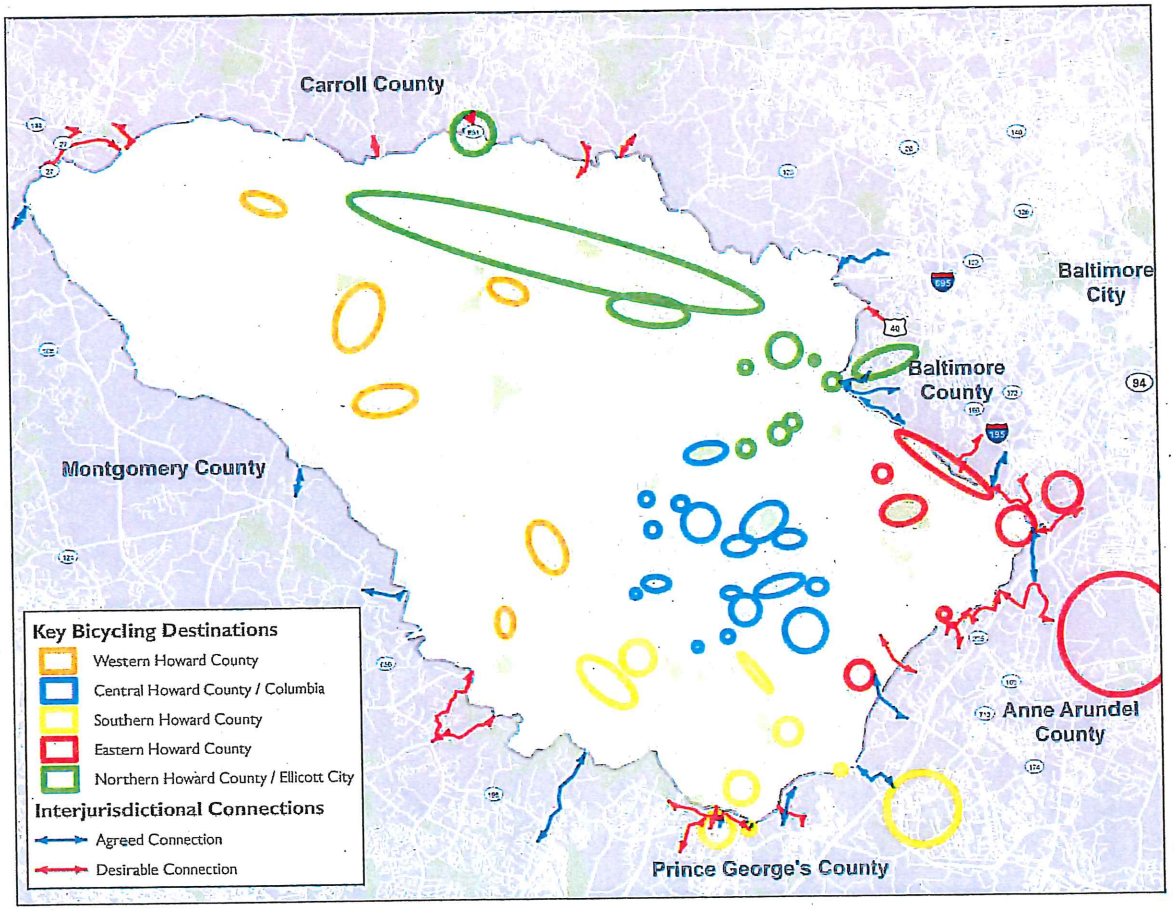
- Dorsey's Search V.C.
- Ellicott City North/Route 40 Commercial Areas
- HC Government Center
- Historic Ellicott City
- Long Gate
- Meadowbrook Park
- Miller Branch Library
- No. 9 Trolley Trail (Baltimore County)
- Old Frederick Road (Route 99)
- Turf Valley

Western Howard County (7)

- Clarksville/River Hill
- Glenelg
- Glenwood
- Highland
- Lisbon
- Syksville (Carroll County)
- West Friendship

Central Howard County/Columbia (17)

- Blandair Regional Park
- Centennial Park
- Dobbin Road/Columbia Crossing
- Downtown Columbia
- Gateway Commerce Center
- Harper's Choice V.C.
- Hickory Ridge V.C.
- Howard County General Hospital/HC Community College
- Kings Contrivance V.C.
- Lake Elkhorn
- Long Reach V.C.
- Oakland Mills V.C.
- Owen Brown V.C.
- Robinson Nature Center
- Route 175 Park & Ride
- Route 32 Park & Ride
- Wilde Lake V.C.



APPENDIX E

Prioritization and Screening the Bikeway Network

Bike Howard is a master plan which provides specific bikeway facility recommendations for 530 miles of roadway and trails based upon an assessment of existing conditions conducted in 2012-2013. Existing conditions assessment included a combination of windshield and "street-view" assessment of roads and field assessment of trails, as well as an assessment of planning and design documents at various levels of detail.

The purpose of dividing the comprehensive countywide set of recommendations into smaller subsets is to develop a phasing framework that can guide implementation. This process established Bike Howard priorities for funding and implementation actions in three timeframes:

- Short-Term (2014-2023; 10 years)
- Mid-Term (2024-2033; 10 years)
- Long Term (2034 and beyond)

The Short-Term Network is composed of key existing facilities, a number of projects that are already in design and/or funded, and a small set of recommended improvements to undertake by 2023.

The Mid-Term Network is composed of the Short-Term Network, an even larger set of existing facilities and a large set of recommended improvements to undertake prior to 2033.

The Long-Term Network is composed of all recommendations that are not in the Short-or Mid-Term Networks. This includes a large set of recommendations that are unlikely to be undertaken prior to 2033, due to their cost and the likelihood that they will not be needed until larger numbers of cyclists are using the roadway system.

To select routes and the corresponding improvement recommendations for the Mid- and Short-Term Networks, a set of criteria was established using factors identified by the public during public outreach efforts and the Technical Advisory Committee (TAG). The criteria were first used to identify the Mid-Term Network. A more refined use of the same criteria was used to identify the Short-Term Network.

The Prioritization Criteria

After identification of a variety of factors that might be relevant for prioritizing recommendations, the factors were grouped into three categories: overarching, geographic and process-oriented.

- Overarching criteria address values that should be represented in most recommendations for the Mid-Term Network, including: safety, serving less-skilled riders, and leveraging existing facilities.
- Geographic criteria relate to the location of the recommendation. The purpose in applying geographic criteria is to ensure that the Mid-Term Network provides connectivity and continuity to destinations identified by the public as important for bicycle access.
- Process/implementation criteria address factors related to the physical nature of the recommendation, including facility type, and other logistical issues related to implementation, including engineering feasibility, and the estimated cost. These criteria were utilized primarily to identify a smaller network that could be implemented in the near term; thus the concept of a Short-Term Network emerged.

Table 1 provides a more detailed outline of the criteria used for prioritization.

Table 1: Prioritization Criteria

Overarching Criteria	Process/Implementation Criteria	Geographic Criteria
1. Safety	1. Facility Type	1. Focus on the populated/developed core of the county (water/sewer service area)
2. Focus on Serving Less-Skilled Riders	2. Engineering Feasibility (i.e. level of effort)	2. Create Connectivity Between Important Destinations: • Community & Commercial Centers • Major Residential Neighborhoods • Employment Sites • Major Trails • Schools, Libraries • Parks, Recreation Centers, Entertainment Venues • Public Transit Hubs
3. Leverage Existing Facilities	3. Opportunity	3. Align with Columbia Association Priorities
	4. ROW Control	4. Develop Select Scenic/Recreational Routes
	5. Terms of Funding	5. Address Barriers
	6. Amount of Time to Implement	
	7. Cost	

The Mid-Term Network

The Mid-Term Network was identified primarily by using the overarching criteria and the geographic criteria to filter the Long-Term Network into a more manageable set of recommendations.

Overarching Criteria

Safety--By their very nature all of the recommendations embody the goal to make bicycling safer. To provide a more focused emphasis on safety, the intersections identified in the Mid-Network Network have been identified as the highest safety priorities.

Connectivity—A baseline assumption for all Mid-Term Network recommendations is that they must be connected to each other, to existing facilities or to Key Destinations. There can be no gaps; and each network while limited in scope, should be fully functional when build out is complete.

Focus on Less-Skilled Riders—To ensure that the Mid-Term Network will attract less skilled cyclists, it is has been designed to provide a balance between variable and low-stress bikeways and seeks to provide both on-road and off-road alternatives in key corridors.

Leveraging Existing Facilities—Because of the extensive existing pathway system in Columbia and recently approved Connecting Columbia plan, leveraging existing facilities emerged in the planning process as a key criterion. Each of the following categories of existing or already-planned bicycling facilities has contributed segments to the Mid-Term Network:

- the Columbia pathways, owned and managed by Columbia Association;
- existing County Trails, managed by the Department of Recreation and Parks;

- existing, bicycle-pedestrian bridges, tunnels and underpasses;
- low speed / low volume County roads and neighborhood streets;
- low speed / medium-low volume streets and roads for which improvement recommendations are made in the plan, but will serve cyclists well in the short term even before those improvements are implemented.
- State roadways with adequate shoulders; and
- trail facilities and road improvement efforts that are already planned and funded.

Geographic Criteria

Creating Connectivity Between Important Destinations

The geographic criteria in Table 1 were used to identify the Mid-Term Network in a number of ways. First, a set of 51 destinations throughout the county were identified and confirmed by the TAG as key destinations needing service. These locations included neighborhoods, institutions, public facilities, parks, recreational trails, and commercial centers drawn from among the categories in Table 1-- *Geographic Criteria item 2.*

Figure 1: Map of Key Bicycling Destinations and Inter-jurisdictional Connections

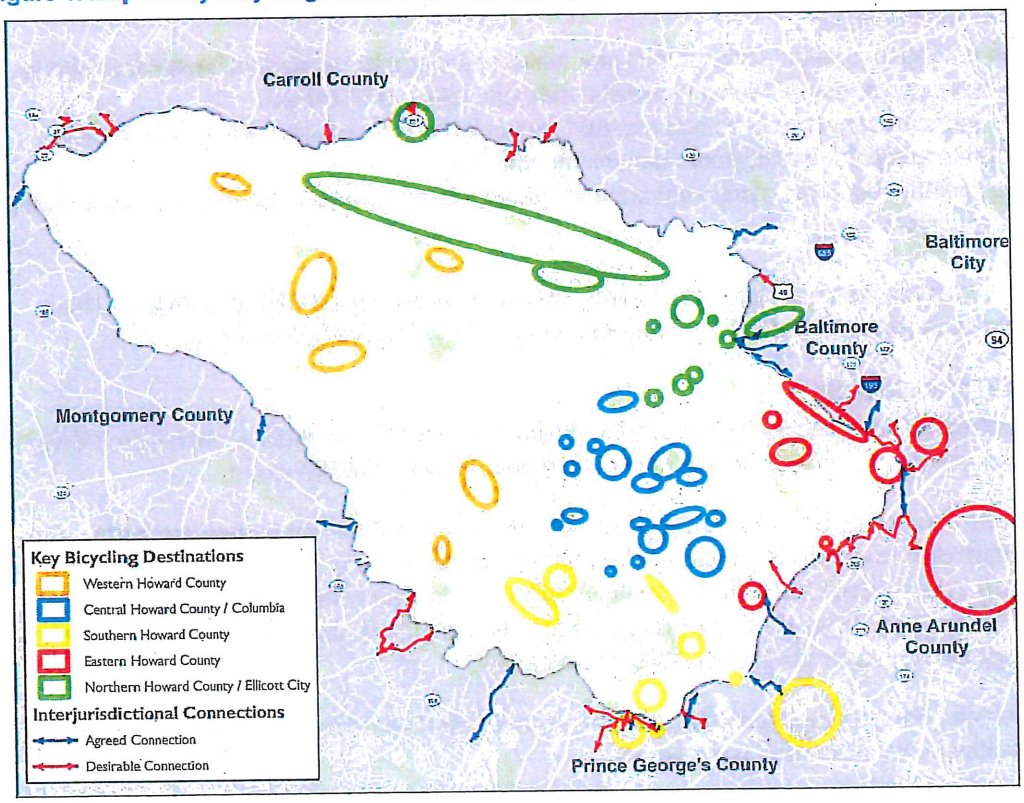


Figure 1 provides a schematic map of these locations, which are listed by name in Appendix D. Locations were selected throughout the County and in adjacent jurisdictions; however fewer locations were selected in rural and low density areas. In the selection process, emphasis was placed on the most heavily populated and developed core of the County, which can be best understood as the area within the planned water and sewer service boundary.

Connecting Columbia pathways plan: In general this plan accepts the recommendations of the Connecting Columbia Active Transportation Action Agenda. Particular recommendations from the CA plan were also selected for the Mid-Term Network if they also fulfilled other criteria, such as connectivity to key destinations, providing service to less-skilled riders, or because they contributed to key countywide routes.

Scenic and recreational routes: Recreational cycling is both popular and important to the County for health, quality of life and economic reasons and improving safety along the most heavily traveled recreational routes is a key goal of this plan. As a result the Mid-Term Network includes key recommendations along a basic set of routes that connect the historic communities of Elkridge, Savage, Ellicott City and popular scenic bicycling corridors in the Patapsco Valley, along highway 99 and in the closer-in portions of western Howard County.

Barriers: Addressing barriers is maybe the most challenging criteria to fulfill within a limited set of recommendations. Many barriers to bicycling are major highways, railroad corridors or rivers, which typically require high cost bridges or tunnels to solve. Large natural areas that are barriers may require costly trails with bridges and boardwalks to address sensitive environmental landscapes. For this reason the following approach was use to select routes for the Mid-Term Network:

1. Use and improve trail and road routes that cross limited access highways at locations where there are no interchanges.
2. Improve the transportation utility of trails that have existing grade separated crossings (bridges, tunnels or underpasses) of major highways, railroads, rivers and streams.
3. Provide improvements to routes that use the most convenient and direct alternatives around barriers that cannot be directly addressed in the near term.
4. Provide a priority list of key grade separations that can be pursued as major funding opportunities become available.

Based upon the Overarching and Geographic criteria described above, the Mid-Term Network. This network was able to provide connectivity to more than 90 percent of the key destinations.

The Short-Term Network

The Short-Term Network was identified by utilizing the following criteria to reduce the Mid-Term Network into a set of recommendations that could be implemented in approximately 10 years:

1. The concept of connectivity was more strictly defined as development of a few key north-south routes from the Government Center area in the north to North Laurel in the south. Also a few east-west routes linking the Howard County Hospital to Rockburn Regional Park and Dorsey MARC Station; and River Hill to the Savage MARC Station. Inclusion of Downtown Columbia and core neighborhood such as Oakland Mills was a priority.

2. The criterion of leveraging the existing pathway systems and path improvement projects such as the Downtown Columbia Trail were central.

3. The goal of improving recreational routes was included, but kept to a minimum, with a focus on some of the most critical roads in Western Howard County.

4. With this focus the final criteria applied included those from the process and implementation category which helps identify those projects that are lowest in cost and easiest to implement. Moreover, to keep costs reasonable, the total volume of recommended improvements had to be small, so duplication of routes was minimized.

Process-Oriented Criteria

Following are some of the factors that are included in this category of criteria:

1. Facility type—On-Road, Off-Road and Spot Improvements are among the elements of the Short-Term Network.
2. Engineering feasibility—Determined by engineering and design issues presented by the recommended facility type and its context.
3. Right-of-way control—Who owns the road, trail, open space corridor, or private property upon which the improvement is to be located?
4. Price/cost – Largely determined by items 1 and 2 above.
5. Opportunity – Due to proximity or other factors, can/should the recommendation be incorporated into other development or construction activity, whether public, private, road-related, park-related, trail-related, etc.
6. Amount of time it takes to plan, design, and construct the recommendation – Largely determined by items 1-5 above.

In general, for implementation of the Short-Term Network to be practical and realistic in a five year timeframe, it should consist primarily of recommendations that can best be described as ***"Low Hanging Fruit."*** However, it is not possible for 100 percent of projects in the Short-Term Network to be *Low Hanging Fruit.*

Projects that can be described as *low hanging fruit* include those that meet the following criteria:

a) Facility Type:
   - shared lane markings (sharrows),
   - bike lanes,
   - climbing lanes,
   - striping existing shoulders,
   - widening existing sidewalks,
   - widening or resurfacing existing trails,
   - making simple and small spot improvements, i.e. trail access, short trail extensions, modest intersection improvements, replacing small bridges over streams, improving signage, etc.

b) Level of Effort
   - Engineering feasibility—Simple; implementable within existing public right-of-way; no or minimal impact to existing road or trail uses and the surrounding context.
   - Right-of-Way control—County roadway, County or CA pathway, Howard County Public Schools, or likelihood of finding a willing private property partner.
   - Project types that take no more than 3 years to plan, design, and construct; many can be done in 1 to 2 years.

c) Minor Actions, i.e. can be done...
   - a) by simply adding striping/signs to existing pavement;
   - b) in conjunction with a County road resurfacing project, or minimum impact restriping project;
   - d) in conjunction with an already planned State road improvement or other project by a public agency, such as parks, schools, water and sewer authority, etc.
   - c) by a developer with an approved development;

d) Price/cost – Low, less than $300,000 per mile for linear improvements, or $300,000 per location for spot improvements.

APPENDIX F

Spot Improvements

Spot Improvements by Network

Bike Howard ID Number	Recommended Facility Improvements	Action	Network	Location
3	Bike Link	Upgrade Existing	Short Term	Patuxent Branch Trail @ Old Guilford Rd.
9	Bike Link	Construct New	Short Term	Columbia Rd. @ Clarksville Pike (going northbound)
13	Bike Link	Upgrade Existing	Short Term	On Ridge Rd. @ Rogers Ave. and Courthouse Dr.
59	Bike Link	Construct New	Short Term	Northfield Elementary School
110	Bike Link	Upgrade Existing	Short Term	Brunners Run Ct. @ Old Montgomery Rd.
195	Bridge	Construct New	Short Term	Bridge West of Northfield Elementary
191	Interior Pathway Crossing	Construct New	Short Term	Hickory Ridge Rd. @ Broken Land Pkwy.
2	Mid Block Crossing	Construct New	Short Term	Cape Ann Dr. between Cottonmill Ln. and Quantrell Row
102	Mid Block Crossing	Construct New	Short Term	Knights Bridge Rd. @ Stebbing Way
138	Mid Block Crossing	Upgrade Existing	Short Term	Centennial Park East Entrance @ Woodland Rd.
139	Mid Block Crossing	Construct New	Short Term	Old Annapolis Rd. (275 ft. West of Columbia Rd.)
150	Mid Block Crossing	Construct New	Short Term	375 ft. E of East Wind Way along Hickory Ridge Rd.
161	Mid Block Crossing	Construct New	Short Term	Mayfield Ave. @ Waterloo Rd.
200	Mid Block Crossing	Construct New	Short Term	Vollmerhausen Rd. (1900 ft. West of Savage Guilford Rd.)
17	On Road Crossing	Upgrade Existing	Short Term	Centennial Park South Entrance @ Clarksville Pike
35	On Road Crossing	Construct New	Short Term	Arcadia Dr. @ Frederick Rd.
54	On Road Crossing	Upgrade Existing	Short Term	Little Patuxent Pkwy. @ Broken Land Pkwy.
58	On Road Crossing	Upgrade Existing	Short Term	Long Gate Pkwy @ WB Rt. 100 to Long Gate Pkwy Ramp
70	On Road Crossing	Construct New	Short Term	Chatham Rd. @ Frederick Rd.
90	On Road Crossing	Construct New	Short Term	Long Gate Pkwy. @ Montgomery Rd.
91	On Road Crossing	Construct New	Short Term	Old Columbia Pike @ Montgomery Rd.
116	On Road Crossing	Upgrade Existing	Short Term	Mellenbrook Rd. @ Old Annapolis Rd.
124	On Road Crossing	Upgrade Existing	Short Term	Old Columbia Rd. @ Guilford Rd.
131	On Road Crossing	Upgrade Existing	Short Term	All Saints Rd. @ Rt. 216
132	On Road Crossing	Upgrade Existing	Short Term	Rt. 216 @ Baltimore Ave.
152	On Road Crossing	Construct New	Short Term	Twin Rivers Rd. @ Governor Warfield Pkwy.
154	On Road Crossing	Upgrade Existing	Short Term	Long Gate Pkwy. @ Rt. 100
162	On Road Crossing	Upgrade Existing	Short Term	Stanford Blvd. @ McGaw Rd.
165	On Road Crossing	Upgrade Existing	Short Term	Washington Blvd. @ Corridor Rd.
174	On Road Crossing	Construct New	Short Term	Junction Dr. @ Dorsey Run Rd.
178	On Road Crossing	Construct New	Short Term	Homewood Rd. @ Clarskville Pike
190	On Road Crossing	Upgrade Existing	Short Term	Grace Dr. @ Cedar Ln.
8	Pathway Crossing	Upgrade Existing	Short Term	Columbia Rd. @ Clarksville Pike
68	Pathway Crossing	Upgrade Existing	Short Term	Beaverkill Rd. @ Harpers Farm Rd.
69	Pathway Crossing	Construct New	Short Term	Columbia Rd. @ Old Annapolis Rd.
164	Pathway Crossing	Upgrade Existing	Short Term	1200 ft. North of Dobbin Center Way
41	Signal Improvement	Upgrade Existing	Short Term	Old Columbia Rd. @ Eden Brook Dr.
48	Signal Improvement	Upgrade Existing	Short Term	McGaw Rd. @ Snowden River Pkwy.
194	Signal Improvement	Upgrade Existing	Short Term	Windstream Dr. @ Green Mountain Circle
193	Signal Improvement	Construct New	Short Term	200 ft. West of EB Rt. 32 to Broken Land Pkwy. South Ramp

Spot Improvements by Network

Bike Howard ID Number	Recommended Facility Improvements	Action	Network	Location
199	Signal Improvement	Construct New	Short Term	Frederick Rd. (400 ft. East of Main St.)
1	Trail Access	Construct New	Short Term	Seneca Dr. @ Wesleigh Dr.
104	Trail Access	Construct New	Short Term	Ridings Way (260 ft. South of Lawson Ln.)
140	Trail Access	Construct New	Short Term	Trail Access at Wild Filly Ct.
202	Trail Access	Construct New	Short Term	Farewell Rd. (250 ft. East of Woodblock Rd.)
22	Tunnel	Existing	Short Term	Oakland Mills Rd. (350 ft. North of Downdale Pl.)
112	Tunnel	Existing	Short Term	Tunnel @ Rt. 175 near Cloudleap Ct.
113	Tunnel	Existing	Short Term	Whiteacre Rd. @ Thunder Hill Rd.
114	Tunnel	Existing	Short Term	Mirrorlight Pl. @ Thunder Hill Rd.
115	Tunnel	Existing	Short Term	Rt. 175 Tunnel between Old Deep Ct. and Bluecoat Ln
117	Tunnel	Existing	Short Term	Along Tamar Dr. (320 ft. East of Phelps Luck Dr.)
203	Bridge	Construct New	Short Term	US 29 Pedestrian and Bicycle Bridge
12	Bike Link	Upgrade Existing	Mid Term	Baltimore National Pike @ Governors Run
24	Bike Link	Construct New	Mid Term	On Old Columbia Rd. adjacent to Rivers Edge Rd.
63	Bike Link	Construct New	Mid Term	Wegmans on McGaw Rd.
73	Bike Link	Construct New	Mid Term	Medical Pavilion Parking Lot to Campus Dr. @ HCC
99	Bike Link	Construct New	Mid Term	100 ft. North of Rt. 216 and East of Maple Lawn Blvd.
100	Bike Link	Upgrade Existing	Mid Term	Bike link 270 ft. East of West Running Brook Rd.
180	Bike Link	Construct New	Mid Term	Along Rt. 97 by Misty Meadow Stables
72	Bridge	Construct New	Mid Term	North of Rivulet Row @ Green Mountain Circle
74	Bridge	Construct New	Mid Term	Rt. 175 between Tamar Dr. and Thunder Hill Rd.
106	Bridge	Construct New	Mid Term	Bridge access over Hammond Branch (1350 ft. East from Stephens Rd.)
134	Bridge	Construct New	Mid Term	Broken Land Pkwy. Bridge (1100 ft. South of Cradlerock Way)
135	Bridge	Construct New	Mid Term	Bridge that is 800 ft. North of Patuxent Woods Dr.
192	Bridge	Construct New	Mid Term	Bridge 425 ft. North of Grace Dr. on Cedar Ln.
198	Bridge	Construct New	Mid Term	Oella Ave. @ Frederick Rd.
18	Mid Block Crossing	Construct New	Mid Term	Columbia Rd. @ Plumtree Branch
57	Mid Block Crossing	Construct New	Mid Term	Cooks Ln. @ Old Columbia Pike
71	Mid Block Crossing	Construct New	Mid Term	Twin Rivers Rd. @ Harpers Farm Rd.
88	Mid Block Crossing	Construct New	Mid Term	EB Johns Hopkins Rd. To NB Rt. 29 Ramp
101	Mid Block Crossing	Construct New	Mid Term	West Running Brook Rd. (185 ft. North of Hermit Path)
105	Mid Block Crossing	Upgrade Existing	Mid Term	Jeanne Ct. @ Gorman Rd.
169	Mid Block Crossing	Upgrade Existing	Mid Term	Rt. 216 @ Rt. 29 Ramp (Roundabout)
14	On Road Crossing	Upgrade Existing	Mid Term	Washington Blvd @ Levering Ave.
19	On Road Crossing	Upgrade Existing	Mid Term	Ten Oaks Rd. @ Clarksville Pike
20	On Road Crossing	Upgrade Existing	Mid Term	Triadelphia Mill Rd. @ Ten Oaks Rd.
23	On Road Crossing	Construct New	Mid Term	Rivers Edge Rd. @ Rt. 29
26	On Road Crossing	Upgrade Existing	Mid Term	Cedar Ln. @ Harriet Tubman Ln.
27	On Road Crossing	Upgrade Existing	Mid Term	Rt. 97 divided highway towards Monticello Dr.
28	On Road Crossing	Upgrade Existing	Mid Term	Rt. 97 @ WB I-70 to Rt. 97 Ramp (Northside)

Spot Improvements by Network

Bike Howard ID Number	Recommended Facility Improvements	Action	Network	Location
29	On Road Crossing	Upgrade Existing	Mid Term	Rt. 97 @ WB I-70 to Rt. 97 Ramp (Southside)
30	On Road Crossing	Upgrade Existing	Mid Term	Rt. 97 @ EB I-70 to Rt. 97 Ramp (Southside)
31	On Road Crossing	Upgrade Existing	Mid Term	Rt. 97 @ EB I-70 to Rt. 97 Ramp (Northtside)
34	On Road Crossing	Construct New	Mid Term	Baltimore National Pike @ Rogers Ave.
36	On Road Crossing	Construct New	Mid Term	Pine Orchard Ln. @ Baltimore National Pike
37	On Road Crossing	Upgrade Existing	Mid Term	Frederick Rd. @ Baltimore National Pike
38	On Road Crossing	Construct New	Mid Term	Vollmerhausen Rd. @ Guilford Rd.
40	On Road Crossing	Construct New	Mid Term	Area between EB Rt. 32 and Guilford Rd along Sanner Rd.
45	On Road Crossing	Upgrade Existing	Mid Term	Centennial Ln. @ Clarksville Pike
47	On Road Crossing	Upgrade Existing	Mid Term	Dorsey Run Rd. to WB Rt. 32 Ramp @ Dorsey Run Rd.
53	On Road Crossing	Upgrade Existing	Mid Term	Oak Hall Ln. @ Oakland Mills Rd.
60	On Road Crossing	Upgrade Existing	Mid Term	Dobbin Rd. @ Rt. 175
76	On Road Crossing	Upgrade Existing	Mid Term	Little Patuxent Pkwy. @ Little Patuxent Pkwy.
79	On Road Crossing	Construct New	Mid Term	Gracious End Ct. @ Oakland Mills Rd.
86	On Road Crossing	Construct New	Mid Term	North Ridge Rd. @ WB Rt. 40 to SB Rt. 29 Ramp
87	On Road Crossing	Construct New	Mid Term	Montpelier Rd. @ Johns Hopkins Rd.
92	On Road Crossing	Construct New	Mid Term	Saint Johns Ln. @ SB Rt. 29 to Rt. 103 Saint Johns Ln. Ramp
95	On Road Crossing	Construct New	Mid Term	Crossover @ Old Columbia Rd. and 60 ft. North of Rt. 29
129	On Road Crossing	Upgrade Existing	Mid Term	Washington Blvd. @ Guilford Rd.
149	On Road Crossing	Upgrade Existing	Mid Term	300 ft. South of Burntwoods Rd. along Ten Oaks Rd.
151	On Road Crossing	Construct New	Mid Term	115 ft. South of Rt. 32 Ramp on Clarksville Pike
153	On Road Crossing	Construct New	Mid Term	Governor Warfield Pkwy. @ Windstream Dr.
155	On Road Crossing	Construct New	Mid Term	South Haven Dr. @ Montgomery Rd.
156	On Road Crossing	Construct New	Mid Term	Hale Haven Dr. @ Montgomery Rd.
157	On Road Crossing	Upgrade Existing	Mid Term	Waterloo Rd. @ WB Rt. 100 to Rt. 104 Ramp
158	On Road Crossing	Construct New	Mid Term	Waterloo Rd. @ Old Annapolis Rd.
159	On Road Crossing	Upgrade Existing	Mid Term	Meadowridge Rd. @ Rt. 103 to WB Rt. 100 Ramp
160	On Road Crossing	Upgrade Existing	Mid Term	Meadowridge Rd @ Rt. 103 to EB Rt. 100 Ramp
166	On Road Crossing	Upgrade Existing	Mid Term	Whiskey Bottom Rd. @ Washington Blvd.
167	On Road Crossing	Upgrade Existing	Mid Term	Gorman Rd. @ Washington Blvd.
168	On Road Crossing	Upgrade Existing	Mid Term	North Laurel Rd. @ Washington Blvd.
172	On Road Crossing	Construct New	Mid Term	Owen Brown Rd. @ Cedar Ln.
173	On Road Crossing	Construct New	Mid Term	Dorsey Run Rd. @ Rt. 32
175	On Road Crossing	Construct New	Mid Term	Guilford Rd. @ Dorsey Run Rd.
176	On Road Crossing	Construct New	Mid Term	Eliots Oak Rd. @ Clarksville Pike
177	On Road Crossing	Construct New	Mid Term	Clarksville Pike @ Cedar Ln.
179	On Road Crossing	Construct New	Mid Term	Rt. 97 @ Burntwoods Rd.
187	On Road Crossing	Construct New	Mid Term	Lime Kiln Rd. @ Scaggsville Rd.
196	On Road Crossing	Upgrade Existing	Mid Term	Baltimore National Pike @ Marriotsville Rd.
51	Pathway Crossing	Upgrade Existing	Mid Term	Roundabout on Rogers Ave. @ Old Frederick Rd.

Spot Improvements by Network

Bike Howard ID Number	Recommended Facility Improvements	Action	Network	Location
67	Pathway Crossing	Upgrade Existing	Mid Term	Calico Ct. @ Little Patuxent Pkwy.
77	Pathway Crossing	Construct New	Mid Term	Snowden River Pkwy. @ Rustling Leaf
80	Pathway Crossing	Construct New	Mid Term	Oakland Mills Rd. @ Snowden River Pkwy.
81	Pathway Crossing	Construct New	Mid Term	Solar Walk @ Robert Fulton Dr.
83	Pathway Crossing	Construct New	Mid Term	Dobbin Rd. @ Oakland Mills Rd.
103	Pathway Crossing	Construct New	Mid Term	Foundry St. @ Gorman Rd.
107	Pathway Crossing	Upgrade Existing	Mid Term	Oakland Mills Rd. @ Old Montgomery Rd.
108	Pathway Crossing	Upgrade Existing	Mid Term	Sealed Message Rd. @ Old Montgomery Rd.
109	Pathway Crossing	Upgrade Existing	Mid Term	Tamar Dr. @ Old Montgomery Rd.
111	Pathway Crossing	Upgrade Existing	Mid Term	Footed Ridge @ Majors Ln.
122	Pathway Crossing	Construct New	Mid Term	Xovr Deep Earth Ln. - Good Hunters Ride @ Snowden River Pkwy.
123	Pathway Crossing	Construct New	Mid Term	Rt. 175 @ Waterloo Rd.
163	Pathway Crossing	Upgrade Existing	Mid Term	Dobbin Center Way @ Dobbin Rd.
170	Pathway Crossing	Upgrade Existing	Mid Term	Maple Lawn Blvd. @ Scaggsville Rd. Roundabout
171	Pathway Crossing	Upgrade Existing	Mid Term	Westside Blvd. @ Scaggsville Rd. Roundabout
42	Signal Improvement	Upgrade Existing	Mid Term	Snowden River Pkwy. @ Broken Land Pkwy.
78	Signal Improvement	Construct New	Mid Term	Broken Land Pkwy. (North to WB Rt. 32 Ramp) @ Broken Land Pkwy.
126	Signal Improvement	Construct New	Mid Term	Stevens Forest Rd. @ Broken Land Pkwy.
127	Signal Improvement	Construct New	Mid Term	Cradlerock Way @ Broken Land Pkwy. (Northside)
128	Signal Improvement	Construct New	Mid Term	Cradlerock Way @ Broken Land Pkwy. (Southside)
15	Signal Improvement	Upgrade Existing	Mid Term	Florence Rd. @ Cabin Branch Ct.
16	Signal Improvement	Upgrade Existing	Mid Term	Watersville Rd. @ Frederick Rd
50	Signal Improvement	Construct New	Mid Term	Old Frederick Rd. @ Baltimore County Line
11	Trail Access	Upgrade Existing	Mid Term	Meadowbrook Park @ Long Gate Park and Ride
44	Trail Access	Construct New	Mid Term	End of Painted Rock Rd. near existing trails
65	Trail Access	Upgrade Existing	Mid Term	Trotter Rd. @ Trotter Crossing Ln.
75	Trail Access	Construct New	Mid Term	Summer Hollow Ln. @ Billow Row
137	Trail Access	Construct New	Mid Term	Broken Timber Way @ Five Fingers Way
141	Trail Access	Construct New	Mid Term	Trail Access at Larkspring Row
201	Trail Access	Upgrade Existing	Mid Term	Landing Rd. (2500 ft. North of Montgomery Rd.)
188	Bike Link	Existing	Long Term	Broken Land Pkwy. @ Rt. 32
66	Bridge	Existing	Long Term	Cedar Ln. @ Harpers Farm Rd.
4	Bike Link	Construct New	Long Term	Trail @ Rt. 32 and Brokenland Pkwy to WB Rt. 32 Ramp
49	Bike Link	Construct New	Long Term	Nearby Snowden Square Dr. @ Commerce Center Dr.
184	Bike Link	Construct New	Long Term	Bike Link 125 ft. North of Hanover Rd. near Hi Tech Dr.
185	Bike Link	Construct New	Long Term	Bike Link 190 ft. South of Fetlock Ct.
10	Bridge	Construct New	Long Term	Rt. 29 @ WB Rt. 100 to SB Rt. 29 Ramp
21	Bridge	Construct New	Long Term	Guilford Rd. @ Murray Hill Rd. along Little Patuxent River
25	Bridge	Upgrade Existing	Long Term	Near Carroll County Line and Henryton Center Rd. trail
33	Bridge	Construct New	Long Term	Old Scaggsville Rd. @ Pilgrim Ave.

Spot Improvements by Network

Bike Howard ID Number	Recommended Facility Improvements	Action	Network	Location
39	Bridge	Construct New	Long Term	Trail near Gorman Park @ Middle Patuxent River
61	Bridge	Construct New	Long Term	Dobbin Rd. by Maryland St. Dental Association
62	Bridge	Construct New	Long Term	Dobbin Center Way @ Dobbin Rd.
84	Bridge	Construct New	Long Term	South of WB Little Patuxent Pkwy. to Governor Warfield Pkwy. Ramp
85	Bridge	Construct New	Long Term	Bridge between Columbia Crossing and Dobbin Center
97	Bridge	Construct New	Long Term	Bridge that is 125 ft. South of Hammond Pkwy.
98	Bridge	Construct New	Long Term	Rt. 29 @ Rt. 216 to NB Rt. 29 Ramp
125	Bridge	Construct New	Long Term	650 ft. South of Snowden River Pkwy. to EB Rt. 175 Ramp
136	Bridge	Construct New	Long Term	80 ft. N of Broken Land Pkwy. (W of Owen Brown Rd.)
197	Bridge	Construct New	Long Term	450 ft. East of Santa Barbara Ct.
5	Mid Block Crossing	Construct New	Long Term	Snowden River Pkwy. @ Lincoln Technical Institute
82	Mid Block Crossing	Construct New	Long Term	Robert Fulton to SB Snowden River Pkwy. Ramp
89	Mid Block Crossing	Construct New	Long Term	350 ft. North of Simpson Mill Dr. along Cedar Ln.
143	Mid Block Crossing	Construct New	Long Term	Baltimore National Pike @ Executive Center Rd. (1100 ft from Rogers Ave.)
6	On Road Crossing	Construct New	Long Term	Dorsey's Search Village Center
32	On Road Crossing	Upgrade Existing	Long Term	Hunt Club Rd. @ Washington Blvd.
43	On Road Crossing	Upgrade Existing	Long Term	Merriweather Post Pavilion Driveway @ Broken Land Pkwy.
46	On Road Crossing	Construct New	Long Term	Ten Oaks Rd. @ Linden Church Rd.
55	On Road Crossing	Upgrade Existing	Long Term	Washington Blvd. @ Ducketts Ln.
56	On Road Crossing	Construct New	Long Term	Snowden River Pkwy. @ Rt. 175
93	On Road Crossing	Construct New	Long Term	Loudon Ave. @ Washington Blvd.
94	On Road Crossing	Construct New	Long Term	Montgomery Rd. @ Washington Blvd.
119	On Road Crossing	Upgrade Existing	Long Term	Farewell Rd. @ Oakland Mills Rd.
130	On Road Crossing	Upgrade Existing	Long Term	Jenmar Rd. @ Mission Rd.
145	On Road Crossing	Construct New	Long Term	WB I-70 to Marriottsville Rd. Ramp
146	On Road Crossing	Construct New	Long Term	Marriottsville Rd. (275 ft. South of I-70)
147	On Road Crossing	Construct New	Long Term	Marriottsville Rd. (650 ft. South of I-70)
7	Pathway Crossing	Upgrade Existing	Long Term	West Running Brook Rd. @ Little Patuxent Pkwy.
64	Pathway Crossing	Construct New	Long Term	Shadow Fall Terrace @ Oakland Mills Rd.
96	Pathway Crossing	Construct New	Long Term	Coca Cola Dr. @ Hi Tech Dr.
120	Pathway Crossing	Upgrade Existing	Long Term	Sewells Orchard Dr. @ Oakland Mills Rd.
121	Pathway Crossing	Upgrade Existing	Long Term	Fairmead Ln. @ Oakland Mills Rd.
142	Pathway Crossing	Construct New	Long Term	Saint Johns Ln. @ SB Rt. 29 to WB Rt. 40 Ramp
144	Pathway Crossing	Upgrade Existing	Long Term	Woodbine Rd. @ Frederick Rd.
148	Trail Access	Construct New	Long Term	Trail Access between Elibank Dr. and Montgomery Rd.
52	Tunnel	Construct New	Long Term	Centre Park Dr. @ Rt. 100
118	Tunnel	Existing	Long Term	Along Tamar Dr. (150 ft. North of Lamskin Ln.)
133	Tunnel	Construct New	Long Term	1000 ft. South of NB Rt. 29 to Johns Hopkins Rd. Ramp
181	Tunnel	Upgrade Existing	Long Term	Brumbaugh St. @ Main St.
182	Tunnel	Existing	Long Term	Tunnel by Baltimore County Line and 3600 ft. West of I-95

Spot Improvements by Network

Bike Howard ID Number	Recommended Facility Improvements	Action	Network	Location
186	Tunnel	Construct New	Long Term	Northside of Rt. 29 at Rt. 40

APPENDIX G

Downtown Columbia Circulation Plan

wntown Columbia Bicycle Facilities and Circulation Plan

Number	Road or Area Name	From	To	Facility Type Recommendation	Description of Recommendation
1A	Little Patuxent Parkway (eastside leg of north/south alignment)	Columbia Road	South Entrance Road	Shared Use Path	The 10 foot shared use path will follow the eastside of Little Patuxent Parkway from Columbia Road south to South Entrance Road.
1B	Little Patuxent Parkway (westside leg of north/south alignment)	Columbia Road	Governor Warfield Parkway	Shared Use Path	The 10 foot shared use path will follow the westside of Little Patuxent Parkway from Columbia Road south and continue to the intersection of Governor Warfield Parkway and Little Patuxent Parkway
1C	Little Patuxent Parkway (south side of east/west alignment)	South Entrance Road	Governor Warfield Parkway/Banneker Road	Shared Use Path	The 10 foot shared use path will follow the south side Little Patuxent Parkway from South Entrance Road to Governor Warfield Parkway/Banneker Road. This recommendation harmonizes with HHI's multi use path.
1D	South Entrance Road	Little Patuxent Parkway	Southwest Corner of Lakefront Neighborhood Building.	Shared Use Path	The shared use path will follow the east side of the South Entrance Road from Little Patuxent Parkway and transition around the southeast corner of the Lakefront Neighborhood Building. This recommendation harmonizes with the proposed multi use path.
1E	Little Patuxent Parkway (westside of Little Patuxent Parkway at Governor Warfield Parkway)	Governor Warfield Parkway	Sterret Place	Shared Use Path	The shared use path will follow the west side of Little Patuxent Parkway.
1F	South Entrance Road	Little Patuxent Parkway	Intersection of South Entrance Road and proposed extension of Symphony Wood Road.	Shared Use Path	The shared use path will follow the west side of South Entrance Road.
1G	US 29 Crossing	Lakefront	Oakland Mills, Blandair, and points east	New Bridge	New bridge will connect Downtown Columbia with Oakland Mills and other areas east of Route 29.
1H	Multi Use Pathway	US 29 bridge	Blandair	Shared Use Path	A shared use path will allow access to Oakland Mills and Blandair.
2	Columbia Road	Little Patuxent Parkway	Ten Mills Road	Bike Lanes	The bike lane will follow the north bound leg of Columbia Road to Ten Mills Road. A southbound bike lane could be accommodated with by shifting pavement markings.
3A	Sterret Place	Columbia Mall Circle	Wincopin Circle Extended	Bike Lanes	Bike lanes are proposed on Sterret Place from Columbia Mall Circle to proposed Wincopin Circle extended.

Downtown Columbia Bicycle Facilities and Circulation Plan

Number	Road or Area Name	From	To	Facility Type Recommendation	Description of Recommendation
3B	Wincopin Circle	Little Patuxent Parkway	Existing terminus, with extension of facilities north	Sharrows	Sharrows are proposed for the existing road and on the proposed extension to the north.
3C	Access road to Whole Foods site	Little Patuxent Parkway	Shared Use Path from Wincopin.	Bike Lane	Bike lanes are proposed for the access road to Whole Foods.
3D	Existing private access roads	Area Wide		Sharrows	Sharrows are proposed for existing and proposed access roads within the neighborhood.
3E	Existing paths	Vantage Point Road	To Lakefront Area	Shared Use Path	Expand existing and/or proposed paths to ultimate pavement width of 10 feet.
3F	Existing open area	Existing terminus at American City Building	Access road to Whole Foods site	Shared Use Path	A shared use path will allow access to Whole Foods from the north.
4	Columbia Mall Circle	Garage entrance near Sterret Place	Symphony Woods Road (See 8B)	Bike Lane/Sharrows	Bike lanes and sharrows are proposed to provide for a path around the mall.
5A	Governor Warfield Parkway	Little Patuxent Parkway/Governor Warfield Parkway	Little Patuxent Parkway/Banneker Road	Shared Use Path	The shared use path will follow the south bound leg of Governor Warfield Parkway.
5B	Governor Warfield Parkway	Little Patuxent Parkway/Governor Warfield Parkway	Little Patuxent Parkway/Banneker Road	Shared Use Path	The shared use path will follow the north bound leg of Governor Warfield Parkway.
6	Broken Land Parkway	Little Patuxent Parkway	Columbia Mall Circle	Bike Lanes	The recommendation for this section Broken Land Parkway is to install bike Lanes. This recommendation does not harmonize with the approved plan. The approved plan does not propose any treatment, however this is an important segment of the proposed network.
6A	Broken Land Parkway	Little Patuxent Parkway	Stevens Forest Road	Cycle Tracks	The proposed two way cycle track will follow the southbound leg of Broken Land Parkway, transitioning to a cycle track in the road median at Hickory Ridge Road and continue across MD 29 to Stevens Forest Road.

Number	Road or Area Name	From	To	Facility Type Recommendation	Description of Recommendation
6B	Broken Land Parkway	Little Patuxent Parkway	1,200 feet south of the intersection of Broken Land Parkway and Little Patuxent Parkway	Shared Use Path	The shared use path will follow the southbound leg of Broken Land Parkway and will connect to an existing path and also transition to existing private road network in the Avalon Community. The first connection will be about 600 feet from the intersection of Broken Land Parkway and Little Patuxent Parkway, in which a spur would connect the two paths. The second transition would be a diversion into the Avalon community from the right of way into the property across a landscaped area at a point about 1,200 feet from the intersection of Broken Land Parkway and Little Patuxent Parkway. The transition would connect with proposed sharrow treatment within the Avalon Community.
6C	Broken Land Parkway Extended	Columbia Mall Circle	Terminus	Sharrows	Sharrows have been approved for use.
7	Gramercy Place (Extended)	Gramercy Place	Columbia Mall Circle	Sharrows	Sharrows are proposed to connect with bike lanes on Columbia Mall Circle.
8A	Symphony Woods Road (existing and proposed extension to Little Patuxent Parkway) Avenue Type 3.	Little Patuxent Parkway	South Entrance Road	Bike Lanes	Bike lanes will follow the road in both travel directions.
8B	Symphony Woods Road-extended	Little Patuxent Parkway	Gramercy Place (Extended)	Bike Lanes	Bike lanes are proposed for both travel directions.
9	Hickory Ridge Road (Extended)	Current terminus of Hickory Ridge Road at Broken Land Parkway	Symphony Woods Road	Bike Lanes	Bike lanes are proposed for both travel directions.
10	North-South Collector (Proposed)	Where the North-South Collector overlaps the alignment of Symphony Woods Road.		Bike Lanes	Bike lanes are proposed for both travel directions.
11	Broken Land Parkway	Little Patuxent Parkway	Hickory Ridge Road Extended	Shared Use Path	A shared use path will follow the northbound leg of Broken Land Parkway.
11A	Hickory Ridge Road	Broken Land Parkway	Intersection of Martin Road and Avalon Community access road, then into private development via access road.	Bike Sharrows	The proposed sharrows will be placed on both east and west legs of Hickory Ridge Road from the intersection of Hickory Ridge Road and Broken Land Parkway to the intersection of Hickory Ridge Road and Martin Road. In addition, they will be placed on the access road into the development.
11B	Hickory Ridge Road	Martin Road	150 feet past college square.	Bike Lanes	The proposed bike lanes will be placed on both the east and west legs of Hickory Ridge Road.

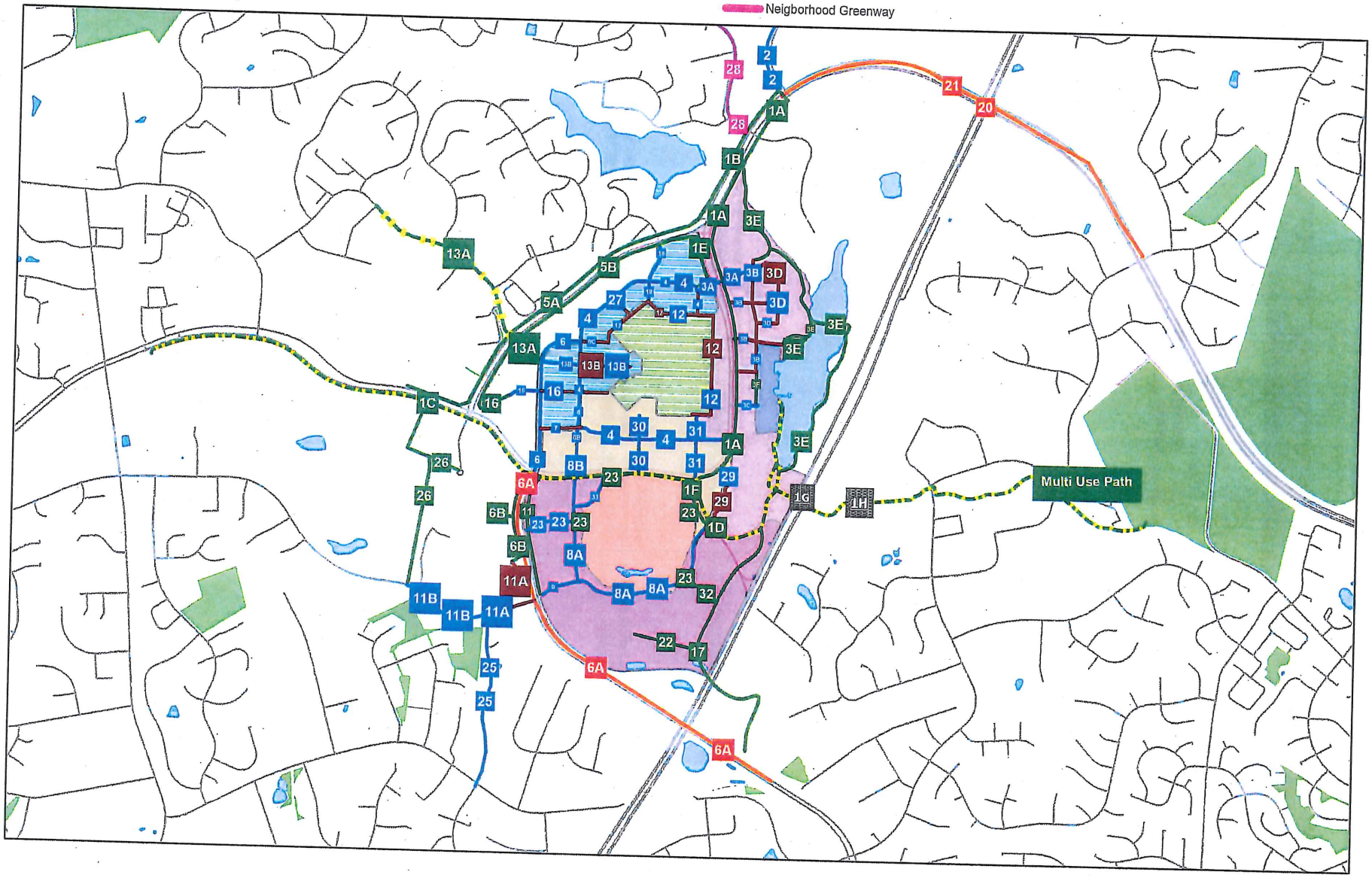
Downtown Columbia Bicycle Facilities and Circulation Plan

Number	Road or Area Name	From	To	Facility Type Recommendation	Description of Recommendation
12	Mall Neighborhood Street Type 3 Network	Area Wide		Sharrows	Sharrows are approved for use for use on the north and east sides of the mall building.
13A	Twin Rivers Road	Wilde Lake Village Center	Broken Land Parkway	Shared Use Path	The project aligns with the proposed shared use path being developed under CEPPA No. 18
13B	Twin Rivers Road and Twin Rivers Road Extended	Broken Land Parkway	To terminus in mall area.	Sharrows/Bike Lanes	The approved plan calls for sharrows and bike lanes.
15	Crescent Neighborhood local network (Street Type 2)				Bike lanes are included with the Street Type 2 typical section par the Downtown Columbia Design Guidance. It should be noted, however, that each developing Neighborhood to date has developed specific Design Guidance for their individual Neighborhood. Also the Road Type abdicated in the Downtown wide Design Guidance is also subject to change when that Neighborhood actually enters the development process.
16	Town Center Avenue (Private Road)	Mall Access Road	Traffic circle within the development	Bike Lanes/Shared Use Path/Sharrows	The proposed bike lanes, sharrows and shared use path will be linked to enhance an existing connection to the intersection of Governor Warfield Parkway and Little Patuxent Parkway.
17	Downtown Columbia Trail/Patuxent Branch Trail Extension	Lake Kittamaqundi area and the multi use pathway	Existing Patuxent Branch Trail	Shared Use Path	This will study a new connection along the Little Patuxent River sewer alignment to Broken Land Parkway, connecting Downtown Columbia at Lake Kittamaqundi and extending south to the existing Patuxent Branch Trail.
18	Windstream Drive	Governor Warfield Parkway	Columbia Mall Circle and existing parking lots.	Bike Lanes	Bike lanes are proposed from the Governor Warfield Parkway intersection to the Mall entrances, transitioning across a parking lot.
19	Mall Alleys	Area Wide		No Recommendations	
20	MD 175/US 29 Bridge	Bridge Structure	Bridge Structure	Cycle Tracks	Cycle tracks are proposed on new bridge structures unless the existing deck structures can be reconstructed to accommodate cycle tracks. ALTERNATE: Cycle tracks are proposed for the existing but reconstructed bridge deck or a new bridge structure.
21	Little Patuxent Parkway	Columbia Road	Bridge Structure	Median cycle track	A 12 to 14 foot median cycle track is proposed from Columbia Road to the US 29 crossing. A bridge to cross a stream would be needed.
22	Crescent Neighborhood	Area Wide		Bike Lanes and Shared Use Paths	Bike Lanes are proposed for circulation on local private access roads. Grade separated Shared Use Paths are recommended to access the proposed Downtown Columbia Trail Patuxent Branch Trail Extension

Number	Road or Area Name	From	To	Facility Type Recommendation	Description of Recommendation
23	Merriweather Wood Neighborhoods	Area Wide		Shared Use Path/Bike Lanes	Shared use paths are recommended to access the internal portions of the area without road access, bike lanes are recommended for the roads.
25	Martin Road	Hickory Ridge Road	Owen Brown Road	Bike Lanes	The proposed bike lanes would be on both the northbound and southbound sides of Martin Road.
26	New Utility Line ROW Connection	Hickory Ridge Road	HHI's multi use Path	Shared Use Path	The shared use path would use an existing utility ROW to provide a north/south connection from Hickory Ridge Road to HHI's multi use path and could also include a connection to Banneker Road.
27	Columbia Mall Circle Connection	Area Wide		Bike Sharrows	Bike sharrows are proposed to allow connections between the multi use path, Columbia Mall Circle and the Mall.
27	Symphony Overlook Connections	Area Wide		Sharrows	Sharrows are proposed for access roads within the Symphony Overlook neighborhood
28	West Running Brook Road	Little Patuxent Parkway	Hyla Brook Road then north to Centennial Lane	Bike Lanes/Bike Sharrows	Bike lanes from Little Patuxent Parkway to Hyla Brook Road with a transition to sharrows as the road travels north.
29	Swift Stream Place	Little Patuxent Parkway	South Entrance Road	Bike Sharrows	Sharrows will provide for access to the multi use path for the community.
30	Connector Road	Little Patuxent Parkway/HHI multi use path	Columbia Mall Circle	Bike Lanes	Bike lanes are proposed to provide a high quality connection to the multi use path and symphony woods from the mall area.
31	Symphony Overlook Connections	Southeast corner of mall building	South to Little Patuxent Parkway and HHI's multi use path.	Bike Lanes	Bike lanes are proposed from the southeast corner of the mall south to connect to HHI's multi use path, providing a high quality connection.
32	Symphony Woods Connections	Symphony Woods Road	Little Patuxent Trail Extension	Shared Use Path	Shared use path proposed to connect to HHI's multi use path.
33	Merriweather Woods Proposed Road	Little Patuxent Parkway	Symphony Woods Road (existing and proposed extension to Little Patuxent Parkway) Avenue Type 3.	Bike Lanes	Bike lanes are called for on the proposed road.

BIKE HOWARD

Downtown Columbia
Without North South Collector
Bicycle Facilities and Circulation Plan
Map No. 8



BIKE HOWARD

Downtown Columbia With North South Collector Bicycle Facilities and Circulation Plan Map No. 9

Bike Facility Recommendations

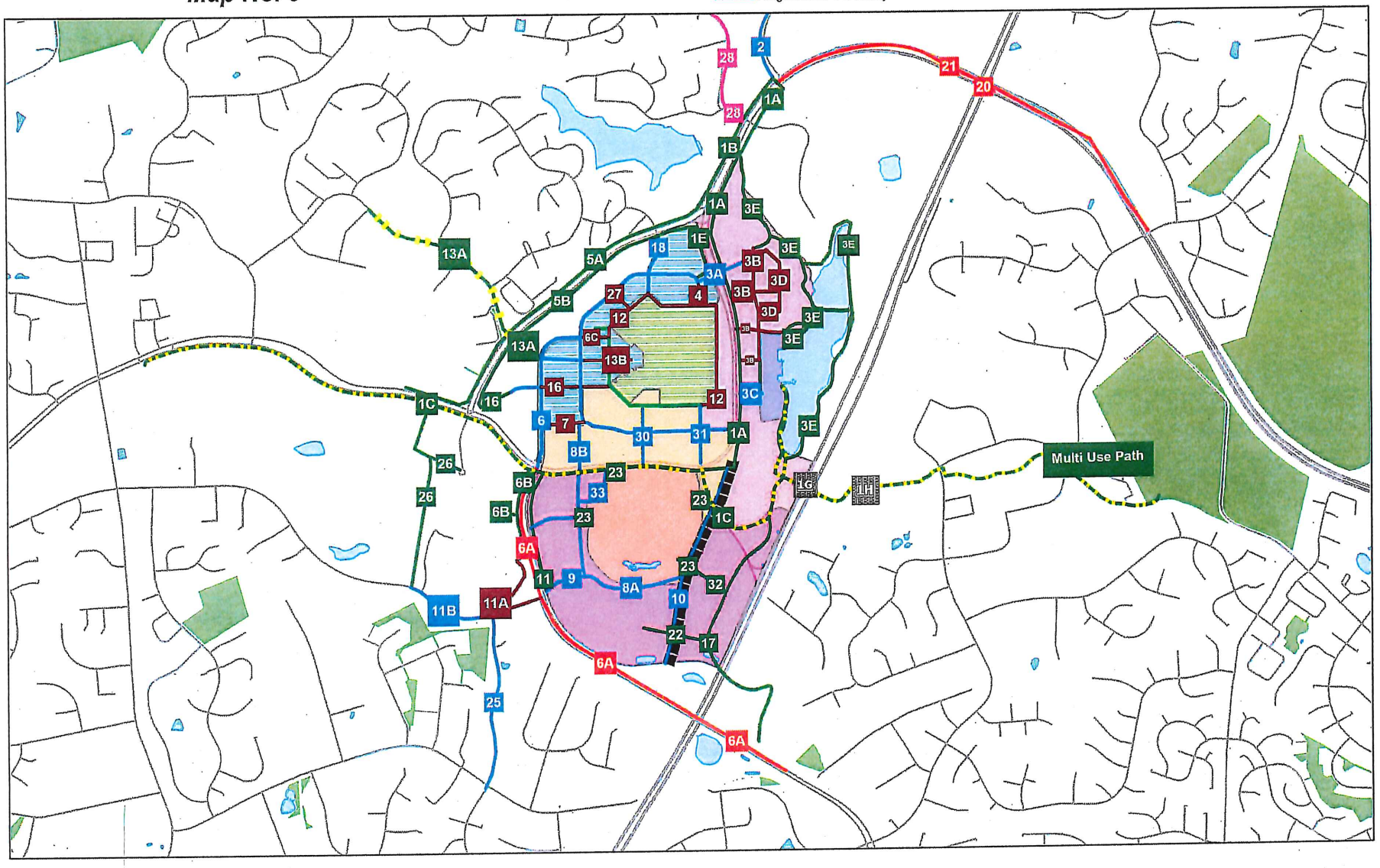
- Shared Use Path
- Cycle Track
- Bike Lane
- Bike Sharrow
- Neigborhood Greenway

Segment Number Label

Required by Approved Downtown Columbia Master Plan

Neighborhoods

- Warfield-Approved
- Mall- Approved
- Crescent
- Lakefront
- Lakefront Core
- Merriweather
- Symphony Overlook



APPENDIX H
Recommendations for State Highways in Howard County

Summary of Facility Recommendations for State Roadways in Howard County

Road Name	Route Number	Existing Conditions	General Facility Recommendations	Specific Facility Recommendations	Short Term	Long Term
Route 1	US 1	Very little space, variable lane widths, high traffic volumes and speeds.	Cycletracks	One way cycletracks each side, colored bike lanes thru interchanges	Bike Lanes and Buffered Bike Lanes based upon space available and truck traffic.	Cycletracks
	MD 32	Wide Shoulders, a few locations where shoulders disappear. Challenging interchanges.	Wide Shoulders	8-12 foot shoulders, safety treatments thru interchanges	Wide Shoulders	Median Path north of I-70
Columbia Pike	US 29	Wide Shoulders; challenging interchanges.	Wide Shoulders	8-12 foot shoulders, safety treatments thru interchanges	Wide Shoulders	Coordinate bicycle accommodations with BRT
Ridge Road	MD 27		Shared Roadway	Safety Treatments and 3-4' shoulders where feasible.	Same	Consistent 5' Shoulders
Baltimore Pike	US 40	Varies--wide but inconsistent shoulders east of Normandy Drive and west of Greenway Drive. No accommodations in the middle.	Combination	Cycletracks west of 29, median path through 29 interchange; cycletracks and buffered bike lanes east of 29	Same	Same
Woodbine Road	MD 94		Shoulders	4'-5' shoulders, spot safety treatments	Same	Same
Roxbury Woods Road	MD 97	Variable shoulder, 3-5' in most areas.	Shoulders	4'-6' shoulders		
Old Frederick Road	MD 99	Some shoulder west of Rodgers to St. John's way; short stretch of bike lanes	Bike Lanes and Shared Roadway w/ Safety Treatments	Consistent 5' Bike Lane or Shoulder; safety treatments west of Marriotsville Road	Same	Consistent 5' Bike Lane or Shoulder
Rouse Parkway/Savage Road	MD 175	Wide Shoulders in some areas, difficult interchanges.	Combination	Median Path; Wide Shoulders (10-12'); buffered bike lanes or cycletracks; some segments have no facility recommendations.	Same	May need a parallel, high speed bikeway with grade separations at interchanges.
Dorsey Road, Meadowridge Road, Montgomery Road	MD 103	Inconsistent shoulder width, 0-3 feet.	Bike Lanes and Cycletracks	Bike Lanes east of Long Gate Parkway; cycletracks from Long Gate Parkway to St. Johns Way/US 29 interchange.	Same	May need buffered bike lanes.
Waterloo Road	MD 104	Wide, but imbalanced shoulder	Sharrows & Bike Lane	Balance the shoulder space and provided bike lanes.	Sharrows	Buffered Bike Lanes
Clarksville Pike, Old Annapolis Road, Waterloo Road	MD 108	Varies tremendously--narrow shoulders in some areas, none in others, new substandard bike lanes near Snowden River Parkway.	Combination	Shoulders 4-6' south of Clarksville; sidepath and shoulders Clarksville to US29; colored bike lanes, shared use path, one way cycletrack, bike lanes, buffered bike lanes to 175.	Sharrows, Spot Safety Treatments, 4-6' Shoulders, Standard Bike Lanes.	Combined On-Road and Off-Road accommodations.

Priority Intersections Involving State Roads

	Approach Leg 1		Approach Leg 2		Approach Leg 3	
No.	Street Name	Route #	Street Name	Route #	Street Name	Route #
1	Washington Blvd	1	Levering Ave.			
2	Washington Blvd	1	Guilford Rd			
3	Washington Blvd	1	Howard St			
4	Washington Blvd	1	Whiskey Bottom Rd			
5	Washington Blvd	1	Meadowridge Rd	103	Meadowridge Rd	103
6	Columbia Pike	29	Old Annapolis	108		
7	Columbia Pike	29	John Hopkins Rd			
8	Patuxent Fwy	32	Dorsey Run Rd			
9	Patuxent Fwy	32	Clarksville Pike	108		
10	Patuxent Fwy	32	Cedar Lane			
11	Baltimore National Pike	40	Coventry Court Dr			
12	Baltimore National Pike	40	Bethany Lane		Centennial Lane	
13	Baltimore National Pike	40	N. Chatham Rd			
14	Baltimore National Pike	40	Ridge Rd			
15	Baltimore National Pike	40	Rogers Ave			
16	Roxbury Woods Rd	97	Burntwoods Rd			
17	Roxbury Woods Rd	97	Baltimore National Pike	I-70		
18	Route 100	100	Waterloo Rd	104		
19	Route 100	100	Meadowridge	103		
20	Montgomery Rd	103	Columbia Pike	US 29		
21	Montgomery Rd	103	Old Columbia Pike			
22	Montgomery Rd	103	Long Gate Pkwy			
23	Montgomery Rd	103	South Haven Drive			
24	Montgomery Rd	103	Brightfield Rd		Meadowridge Road	103
25	St Johns Lane	103	Columbia Road		St Johns Lane	
26	Clarksville Pike	108	Columbia Rd			
27	Clarksville Pike	108	Cedar Lane			
28	Clarksville Pike	108	Elliots Oak Rd			
29	Clarksville Pike	108	Centennial Lane		Beaverbrook Rd	
30	Clarksville Pike	108	Harpers Farm Rd			
31	Clarksville Pike	108	Trotter Rd		Meadow Vista Way	
32	Clarksville Pike	108	Linden Linthicum Ln			
33	Clarksville Pike	108	Clarksville Square Dr			
34	Clarksville Pike	108	Great Star Dr			
35	Clarksville Pike	108	Auto Dr			
36	Clarksville Pike	108	Ten Oaks Rd			
37	Clarksville Pike	108	Guilford Rd			
38	Old Annapolis	108	Mellenbrook Rd			
39	Old Annapolis	108	Waterloo Rd	108	Waterloo Rd	104
40	Waterloo Rd	108	Old Montgomery Rd			
41	Waterloo Rd	108	Mayfield Ave			
42	Waterloo Rd	108	Rouse Pkwy	175		
43	Scaggsville Rd	216	All Saints Rd			
44	Scaggsville Rd	216	Leishear Rd			
45	Scaggsville Rd	216	Ice Crystal Dr			
46	Scaggsville Rd	216	Columbia Pike	Route 29		
47	Scaggsville Rd	216	Maple Lawn Blvd			
48	Cedar Lane		Grace Dr	Near MD 32		
49	Cedar Lane		Guilford Rd	Near MD 32		
50	Johns Hopkins Rd		Montpelier Rd	Near US 29	Old Columbia Rd	
51	Johns Hopkins Rd		Old Columbia Rd	Near US 29	Hammond Pkwy	
52	Long Gate Pkwy		Route 100 Exit Ramp	MD 100		
53	Long Gate Pkwy		Meadowbrook Ln	MD 100		
54	Sanner Rd		Guilford Rd	Near MD 32	Cedar Lane	

APPENDIX I

Wayfinding and Signage Systems

Public comment during both the Bike Howard and the Columbia Association (CA) planning process clearly identified the need for improved wayfinding on both county roads and trails and Columbia association pathways.

Wayfinding refers to a system of signs, land markers, and related environmental elements/cues that guide individuals through an environment and to their destinations. Wayfinding is about effective communication and relies on a succession of word and graphic messages that enable the traveler to make decisions about routing. These decisions are based on inputs that may include destination options, relationships between destinations, mode of travel, type of travel way, direction and distance.

"Wayfinding is a consistent use and organization of definite sensory cues from the external environment" (Lynch, 1960 Image of the City)

Five distinct but related signage needs were identified for Howard County:

1. Wayfinding on the CA pathway system
2. Wayfinding on County Department of Recreation and Parks trails; and HCPS owned trails.
3. On-road bike route signs for Howard County designated routes.
4. On-road route and branding signs related to a specific group of recreational routes, especially in Western Howard County.
5. On-road bike route signs for State Highway Administration designated routes.

The following sketch plan will provide an outline for how to move forward in the development of a wayfinding sign system that achieves these goals:

- It will provide functional, seamless and color coordinated wayfinding guidance for cyclists on both roadway and trail networks.
- It will enable the separate but linked pathway systems of the County and Columbia Association to separately brand their path networks and address their own hierarchy of trails within each system.
- It will enable the State and County to both brand and sign on-road routes that can overlap and use roads belonging to either jurisdiction's network.

Installation of an attractive and coordinated sign system will broaden public awareness of bicycling and in combination with web-based information and traditional maps help users identify low-stress routes, recreation routes and standard routes for people of all ages and skill levels.

Background

Currently, the only signed bicycle routes in the County are along State roadways. Additionally, the MD State Highway Administration is developing a plan to sign a bicycle route on the MD 32 corridor from MD 32 and MD108 to the NSA campus. This route will act as a bicycle alternative to the portions of the highway upon which bicycle use is prohibited.

As of 2013, the Columbia Association is the process of developing a sign system for its pathways. This task was identified in CA's recent pathways plan Connecting Columbia, and is undergoing further study through implementation of signage in a few pilot locations.

Wayfinding Challenges in Howard County

Because it is a suburban county, and because Columbia is a planned community with very specific land use and landscape design standards, Howard County has some unique features that make wayfinding on the street, sidewalk and pathways system difficult. A list of some of these characteristics follows:

- Curvilinear nature of the streets in many residential developments
- Lack of street connectivity between residential pods
- Upon entering a residential pod, the inability to determine if a trail will or will not be provided to exit the pod, and if so, down which cul de sac it will be found.
- The typical landscaping, characterized by earthen berms, of many commercial areas in Columbia make it difficult to see what shopping or other commercial activities may be located within.
- The internal orientation of many commercial areas making it hard to know how to enter and exit them and whether or not internal navigation will be bicycle-friendly or not.
- The barriers created by a number of major highways, stream valleys, railroads, large conservation areas, and other large institutional properties characterized by few good crossings and no wayfinding guidance.

Positive Characteristics to Build Upon

Despite these challenges, one of the many bicycle-friendly pluses of Howard County is the extensive trail system at its core, which provides an amazing level of connectivity, as compared to other suburban counties in Maryland. Adding to this, is a spinal path system extending out from the core along some of the stream valleys, and the existence of a few grade separated crossings of major highways and other barriers. And finally, the presence of many low traffic streets that in combination with trails and future roadway improvements will offer more extensive bicycle access than previously thought possible.

As a result, it is realistic to think that a robust system of signed bicycle routes will encourage more widespread use of bicycles for transportation and also make a positive contribution to safer cycling in the County, even though safety is not the primary objective. Following, is a list of key benefits of a signed bicycle route network.

1. ***Comfort:*** Signed bike routes will provide a higher level of comfort for large numbers of existing and future cyclists:
   - for those who are new to bicycling for transportation purposes;
   - for those who are new in a community;
   - for those who are unfamiliar with a neighborhood where they want to travel;
   - visitors to the County from within the region, and
   - most tourists and business travelers from outside the region who are likely to be unfamiliar with the County.
2. Solutions to bicycling ***navigation*** needs:
   - Provides guidance along routes which are not intuitive or are different from those followed by motorists.
   - Provides critical navigational information, directions, distances, names of destinations, links to other transportation services.
3. Supports bicycle ***encouragement*** efforts by:
   - Providing a discrete element of bicycle infrastructure that can be promoted and marketed to new audiences;

- Creating a visual image of the bicycle in the roadway environment, and in turn, marketing bicycle transportation.

4. Supports bicycle ***safety*** by:
   - Helping cyclists find routes that are appropriate for their skill level;
   - Increasing the overall numbers of people bicycling, which has been shown to increase safety;
   - Providing a widespread indicator for motorists that bicyclists should be expected on most roadways throughout the County.

A framework for developing a signing protocol and route plans for both trails and on-road bicycle routes, and support seamless transitions between the two settings.

The Bicycle Route Framework

Recommendations for development of a system of Signed Bicycle Routes including the following:

In 2014, the County should develop an integrated bikeway sign protocol and manual using the following system of shields and branding graphics:

- ***For CA pathway routes use blue fingerboards.***
  In 2013, the Columbia Association conducted a pilot program that included design and installation of wayfinding signs on a small portion of the CA pathway system. It will use primarily blue fingerboards as exhibited in figure 1.

- ***For County trail routes use brown fingerboards.***
  The Howard County Department of Recreation and Parks currently uses brown wayfinding signs for trails, but does not install signs on all of its trails.

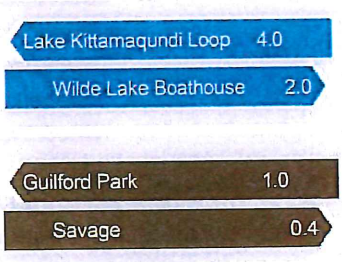


Figure 1: Example wayfinding signs from the Columbia Association.

- ***For standard on-road County routes use the MUTCD D11-1c as shown in Figure 2.***
  For bicycle wayfinding signs to be effective they must extend beyond CA pathways and state highways to include other trails and on street routes. As a result this plan recommends that County roads and trails be included in a coordinated signage effort.

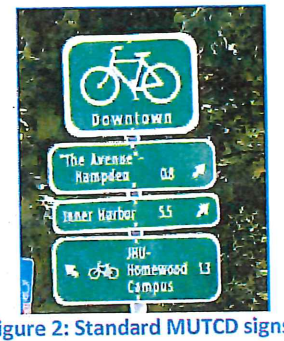


Figure 2: Standard MUTCD signs.

- ***For state routes within the County use the MUTCD sign M1-8a as shown in Figure 3.***
  Currently, the only signed bicycle routes in the County are along State roadways. Additionally, the MD State Highway Administration is developing a plan to sign a bicycle route in the MD 32 corridor that will act as a bicycling alternative to the portions of the highway upon which bicycle use is prohibited. This route would extend from MD 144 in the north to the National Security Administration campus adjacent to Fort Meade, in

Figure 3: MUTCD sign M1-8a.

Anne Arundel County. The state is considering two options provided in the MUTCD.

- ***For on-road recreational routes within the County, develop a new shield design integrating green and blue colors, a shield shape and graphic approach that creates a Howard County and recreational bicycling identity (See Figure 4 for an example from Quebec's La Route Verte).***

The On-Road Recreational Route System should be laid out primarily in western Howard County, but also include routes in the southwest around Fulton, in and around Historic Ellicott City and Savage, as well as in the Patapsco Heritage Greenway and Elkridge Area.

Figure 4: Example shield sign

The purpose of providing a unique brand for a distinct set of recreational routes is twofold:

1. It will assist cyclists with wayfinding and provide a welcoming environment for recreational riders attracted to the part of the County where these routes will be located.
2. By having a unique brand for the more rural recreational routes, the county can coordinate effective safety messaging campaigns geared especially to the safety issues found along these typically narrow rural roads. Through use of a logo and graphic branding, information that is provided on the web, at events, during road safety awareness weeks, on printed materials, etc. can all be associated with the route system where these safe bicycle and motorist road sharing practices are most applicable.

The graphic branding on this sign may include a traditional Howard County graphic brand such as the stalks of wheat. It should also include elements that communicate a friendly-attitude between cyclists and motorists, which is essential to help keep these popular routes safe in the future.

More about the On-Road Recreational Route System

The province of Quebec established a system of in-city and rural bicycle tourism routes with the brand *La Route Verte*. Many are off-road paths, others are on-road routes on low traffic roads. The routes are numbered and blazed as shown in figure 3.

Figure 5: Proud Partners of the Green Route: Transport Quebec

Just like in Howard County, the facilities used for the various routes in Quebec are managed by a variety of agencies, including the provincial transportation department, national park agency, municipalities, etc. Figure 5 illustrates how users are informed of these partnerships. *Translation: Proud Partners of the Green Route: Transport Quebec.*

Figure 6 illustrates how the route shield can also be used in relationship to typical destination guide signs. Destinations on the Route Verte can be distinguished from other destinations that are also accessible by bicycle.

Figure 6: Destination and distance signs

In Howard County, standard safety symbols and other warning and regulatory signs from the MUTCD can be used

to help drivers and cyclists more safely use the narrow two lane roads in the network. These signs would address issues such as poor sight distances, steep grades, potential conflicts at intersections, appropriate passing behavior and other respectful road sharing practices.

More about the Howard County General Route System

The general route system can be developed primarily in the eastern portion of the county, but will include some routes and destinations in the western part of the county that overlap with the Recreational Route System.

The signs for this system should have a different but coordinated graphic identity, so the system is ultimately seen as a whole network. This identity may be design to coordinate much more closely with one of the three design approaches offered by the MUTCD. The examples in Figures 7-9 illustrate how other communities have used the basic green MUTCD Bike Route signs and customized them to meet their own unique branding and system hierarchy needs. It will also need to be coordinated with the aesthetic approach taken by the Columbia Association.

This signage system will knit together trails and roads (including bicycle facility upgrades where recommended in the Plan) into a set of routes based upon their ultimate destination in the County. The routes will be designed to connect all of the major neighborhoods, employment centers, commercial centers and other key destinations. A draft list of these major destinations is provided in an appendix at the end of this document.

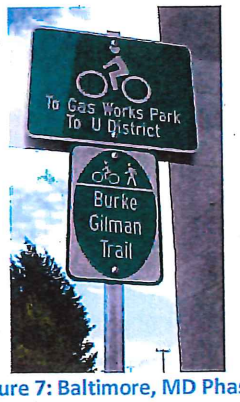


Figure 7: Baltimore, MD Phase 1

Figure 8: Baltimore, MD, Phase 2


Figure 9: Seattle, WA

Key to this system is determining how on-road and off-road route signing will be coordinated. On-road routes have very different signing issues than trail routes. There is also the need to coordinate with CA's work on developing a sign system for CA pathways. Other issues will include how to coordinate with surrounding jurisdictions.

A Bicycle Route Sign Manual and Protocol

A Bicycle Route Sign Manual and Protocol will provide a framework for a logical, legible, and an efficient guide sign system that is applied consistently throughout the County. For a wayfinding sign system to function effectively, it must be understood by users and based on a consistent pattern of sign design and usage. The Protocol will describe how to address on-road bicycle wayfinding and bicycle/pedestrian wayfinding for trails; however, it does not need to address pedestrian wayfinding issues outside of the trail system. These can be addressed in a separate manual.

The Protocol will fulfill the following objectives:

- Ensure consistency and cohesion in the final product, e.g. whether signs are installed along all of the routes at the same time, or over a series of years.
- Ensure that additional routes to be developed and signed in later years will be consistent with the overall system.
- Establish a consistent planning process for evaluating the readiness of routes and developing a sign installation plan, whether it is for a single route, or a set of routes in a particular area of the County.
- Describe how future expansion or contraction of the system should be addressed.
- Explain how to coordinate routing and sign information with the signed bicycle route sign systems of neighboring jurisdictions.
- Establish a standard graphic approach, symbology, lexicon and sign assembly pattern for bicycle route guide signs.
- Establish sign maintenance and replacement systems and practices.

The Protocol will also ensure that sign design adheres to key principals that address navigation needs that are unique to bicycle travel:

- When determining what information needs to be conveyed at any particular location the following must be taken into consideration a) what the cyclists have been told on the previous signs along the route and b) what they will be told on the next sign. All messaging must be considered in sequence.
- Cyclists should be provided less information at decision points (i.e. intersections) where greater attention to traffic (trail or roadway) is required to ensure the cyclists' safety, and more information provided at locations where traffic dynamics are simplified (i.e. along a straight stretch of street where turning movements are reduced and motorists can easily pass).
    - For example, at a location where a challenging left hand turn must be made, only the most basic route guidance should be given prior to and at the turn (main destinations and arrow; no mileage). The distance information can be included on a sign prior to or after the turn.
- Where it is helpful and contributes to safety, integrate operational guidance into wayfinding sign assemblies, such as:
    - USE CROSSWALK, USE SIDEWALK, USE SHOULDER.
    - Or, at a left turning location, a sign panel that reads "USE LEFT LANE" should be provided on a multi-lane arterial, and well in advance of the turn, to ensure that the cyclist has sufficient time to safely move left across through traffic.
- Providing mileage more often in areas where cyclists may be entering the route from any number of side streets and starting points; however, in other locations, if a set of destinations with mileage was just provided a few blocks back and the distances have not changed by more than 0.2 miles, signage at a turn in the route may not need to include mileages and only the destination legend(s) and arrow(s) are necessary.

Route Implementation

Initial sign installation efforts should focus on providing signs along the Spine Route system, the Columbia Association and County pathways systems, and routes that may be developed and designated by the State Highway Administration.

As safety on rural roads is improved and other facilities are installed, the recreational route system and additional County routes in the Primary Network can be signed.

To implement the route systems, subsequent to the adoption of the Master Plan, the County will need to carry out the following tasks:

- Develop a coordinated graphic identity (branding) for each system.
- Develop a Sign Manual and Protocol.
- Conduct a detailed feasibility study of the Spine Network routes identified in the Plan.
- Develop a sign design, fabrication and installation package for one or more routes that are deemed ready for signage.
- Install the signs.
- Coordination timing of sign installation with development of web-based information and traditional maps. The sign and map information systems will help users identify low-stress routes, recreation routes and standard routes for people of all ages and skill levels.

With a Sign Manual and Protocol, the County will be in a position to identify, plan and implement routes as they are made ready with new and upgraded facilities. The network should be signed in multiple phases over a period of years. The primary factors that will guide implementation include the following: the availability of funding for design and implementation, feasibility and route readiness, the time and funding needed to address minor but critical physical deficiencies, and the pace of implementation for both on-road facilities and future trail construction on signed routes.

Draft Destinations for Bicycle Route System

When developing a network of signed bicycle routes, an early task is to identify a logical set of destinations to be served by the signed routes. These destinations will be the main destinations used on the sign panels. A standard approach to this task is to develop three classes of destinations--primary, secondary and tertiary.

- Primary destinations will include those that serve as route endpoints and other destinations of major importance or of the greatest interest to existing and prospective bicyclists.
- Secondary destinations will include those of less importance and many that are along the various routes, but not at their endpoints.
- Tertiary destinations typically include important destinations that may be located a short distance away from a major route, or are of lowest level of importance.

Following is a preliminary set of destinations around which a countywide route system can be developed. They are organized by region.

Eastern Howard County (8)

- BWI Trail (AA County)
- Dorsey MARC Station
- Elkridge
- Grist Mill Trail
- Ilchester
- Rockburn Branch Park
- St. Denis MARC Station (Baltimore County)
- Wholesale Food Center

Southern Howard County (9)

- JHU-Applied Physics Lab
- Laurel (Prince George's County)
- Laurel MARC Station (Prince George's County)
- Maple Lawn
- North Laurel
- NSA/ Ft. Meade (Anne Arundel County)
- Patuxent Branch Trail
- Savage
- Savage MARC Station

Northern Howard County/Ellicott City (10)

- Dorsey's Search V.C.
- Ellicott City North/Route 40 Commercial Areas
- HC Government Center
- Historic Ellicott City
- Long Gate
- Meadowbrook Park
- Miller Branch Library
- No. 9 Trolley Trail (Baltimore County)
- Old Frederick Road (Route 99)
- Turf Valley

Western Howard County (7)

- Clarksville/River Hill
- Glenelg
- Glenwood
- Highland
- Lisbon
- Syksville (Carroll County)
- West Friendship

Central Howard County/Columbia (17)

- Blandair Regional Park
- Centennial Park
- Dobbin Road/Columbia Crossing
- Downtown Columbia
- Gateway Commerce Center
- Harper's Choice V.C.
- Hickory Ridge V.C.
- Howard County General Hospital/HC Community College
- Kings Contrivance V.C.
- Lake Elkhorn
- Long Reach V.C.
- Oakland Mills V.C.
- Owen Brown V.C.
- Robinson Nature Center
- Route 175 Park & Ride
- Route 32 Park & Ride
- Wilde Lake V.C.

APPENDIX J

Example Bicycle Parking Regulations

The following sample guidelines are provided in the plan to provide guidance and direction for new regulations in the County zoning and subdivision codes that govern new development.

Other guidelines that can be considered include those from Baltimore City, Maryland, Frederick County Maryland, and Arlington County, Virginia. See references to these at the end of this Appendix.

These sample guidelines are intended to facilitate adequate and secure short and long term bicycle parking for residents, workers in office and commercial buildings and students and staff in institutional buildings.

They can also serve as a template for those building owners who would like to retrofit existing residential or commercial properties with new or added bike parking facilities.

Draft Bike Parking Guidelines

The proposed presented below are provided as a model for Howard County. Sections include: Why Bike Parking, Definitions, Requirements, Equipment and Installation Design.

Why Bike Parking?

The provision of parking facilities directly encourages people to use their bicycles as a means of transportation. More people are likely to bicycle if they are confident that they will find convenient, secure, and weather protected parking areas at their destination. The following Bicycle Parking Requirements are applicable for accommodating bicycles in all buildings and development types in Howard County.

These requirements also set standards for bicycle parking at public facilities, bike-share stations and shower and changing facilities.

Definitions

Secure/Covered Facilities: Bicycle parking areas that protect the entire bicycle, its components and accessories against theft and against inclement weather, including wind-driven rain. Examples include but are not limited to: indoor bike room, indoor storage area, bike lockers, indoor or outdoor bike valet parking with weather protective cover and siding, areas with security camera linked to live viewers, and/or key access-covered cages with weather-protective siding.

Outdoor/Covered Facilities: Bicycle parking areas that provide some protection against inclement weather and may have added theft security. Covers include but are not limited to a building projection, an awning or tented roof. Siding is not required. Racks associated with covers will allow the user to lock the bicycle frame and one wheel while the bicycle is supported in a stable position.

Outdoor/Open facilities: Bicycle parking areas that permit the locking of the bicycle frame and one wheel to a bicycle rack and which supports the bicycle in a stable position without damage to wheels, frame or components. Cover and/or security enhancements are not provided.

Bicycle parking space: The number of bicycles that can be accommodated by the bicycle racks or facility, as defined by the user's manual for the rack or facility referenced. For the remainder of this document, guidelines refer to spaces, or number of bicycles for which the facility is designed to accommodate.

Requirements

The following are minimum requirements according to building type. Exceeding these minimum requirements is encouraged but not required.

Three-Five Unit Residential Buildings:

- One Secure/Covered bicycle parking space per unit located in an easily accessed basement storage area or adjacent / attached garage or shed.
- Shower / changing facilities as included in each residential unit.

Multi-Unit Residential (6 or more units) Buildings:

- One Secure/Covered bicycle parking space per unit located in an easily accessed dedicated storage area.
- One Outdoor/Covered or Outdoor/Open parking space per five units with a minimum of 2 Outdoor/Covered or Outdoor/Open spaces per building.
- Shower / changing facilities as included in each residential unit.

Office, Commercial & Industrial Buildings:

- One Secure/Covered parking space per worker for 10% of the planned part- and full-time worker occupancy (or 0.3 parking spaces per 1,000 square feet of development), but no fewer than 4 Secure/Covered parking spaces per building.

- One Outdoor/Covered or Outdoor/Open parking space for patrons and visitors for 2.5% of estimated daily building users but no fewer than 4 Outdoor/Covered or Outdoor/Open spaces per building.

- Provide at least one shower / changing facility for any building with 100 or more planned part- and full-time workers (or over 40,000 square feet of development) and one additional shower / changing facility per every 200 planned workers (or 80,000 square feet of development), thereafter. Shower / changing facility requirements may be met by providing the equivalent of free access to on-site health club shower facilities where health club can be accessed without going outside.

Retail Buildings:

- One Secure/Covered bike parking space per worker for 10% of the planned part- and full-time worker occupancy (or 0.3 spaces for 1,000 square feet of development) but no fewer than 2 Secure/Covered parking spaces per building.

- One Outdoor/Covered or Outdoor/Open parking space for patrons and visitors per 5,000 square feet, but no less than 2 Outdoor/Covered or Outdoor/Open spaces per building.

- Provide at least one shower / changing facility for any development with 100 or more planned part- and full-time workers (or over 40,000 square feet of development) and one additional shower / changing facility per every 200 planned workers (or 80,000 square feet of development), thereafter. Shower / changing facility requirements may be met by providing the

equivalent of free access to on-site health club shower facilities where health club can be accessed without going outside of buildings.

Institutional Building & Campus Dormitory Buildings:

- One Secure/Covered parking space
- per student and staff for 15% of the planned part- and full-time campus wide occupancy (or 0.5 parking spaces per 1,000 square feet of development), but no fewer than 4 Secure/Covered parking spaces per building.

- One Outdoor/Covered or Outdoor/Open parking space for patrons and visitors for 5.0% of estimated daily building users but no fewer than 4 Outdoor/Covered or Outdoor/Open spaces per building.

- Provide at least one shower / changing facility for any campus building with 100 or more planned part- and full-time students and staff (or over 40,000 square feet of development) and one additional shower / changing facility per every 200 planned students and staff (or 80,000 square feet of development), thereafter. Shower / changing facility requirements may be met by providing the equivalent of free access to on-site health club or gym shower facilities where health club or gym can be accessed without going outside.

- One Secure/Covered parking space per every two beds in a Dormitory building where such parking spaces may not be counted in the campus wide total.

Mixed- Use Buildings:

- Provide facilities proportional to the mix of uses using the above requirements.

- Shared facilities may be provided for non-residential uses mixed within a single building or for non-residential uses within a single development that is under 50,000 square feet. Specific requirements for unique uses such as senior or assisted living facilities, movie theaters, sports arena or conference venues will be determined on a case-by-case basis. Special provisions such as bicycle valet parking for single events such as concerts may be required.

Bike Parking Equipment and Installation Design

1. Acceptable bike rack designs must have a two point support system for easy access and locking of frame and wheels. The designs must present no sharp edges to pedestrians.

2. Developers are encouraged, but not required to use either a black-powder coated hitch style rack, or an artistic style rack to match Howard County preferred designs.

3. All racks and other fixtures must be securely affixed to the ground or a building.

4. Areas used for bicycle parking should be secure, well-maintained, well-lighted and easily accessible to bicycle riders.

5. No bicycle parking areas should impede sidewalk or pedestrian traffic. Designs that do not provide two-point supports for bicycles create unfit sidewalk conditions. Bicycles can fall over easily and become damaged, or hang out into the pedestrian right-of-way. Older "school" or

"dish" racks are not functional and do not provide full support. Single post designs with sharp edges can also be hazardous to pedestrians with visual disabilities. Racks with one point of contact, like hitch racks need to be in-ground mounted. Examples of recommended racks include: hitch rack, upside down U rack and multiple bike racks.

6. Retail establishments shall have Outdoor/Covered or Outdoor/Open facilities within 50 feet of the primary entrance(s). Racks must be 4-5ft away from hydrants & other street furniture. No bicycle parking shall be located farther from the entrance of a building than the closest automobile parking space (to include accessible parking spaces).Prominently placed signs should be within 50ft of parking & immediately visible. Signs must direct users to all secure/covered or outdoor/covered facilities that are not immediately visible from the street. All bicycle parking shall be separated by a physical barrier/parallel to curb or sufficient distance from car parking and vehicular traffic to protect parked bicycles from damage. Accessible, Indoor & Secure Accessible bike parking encourages daily use with well-maintained and well-lit easy access for riders. Converting on-street car parking to creative bike parking can accommodate up to eight bicycles, and encourage people to use their bikes for shopping and running errands-not just commuting.

Other Example Bike Parking Standards

A) Baltimore City Design Standards for All Bicycle Parking

(1) Required bicycle spaces must have a minimum dimension of two (2) feet in width by six (6) feet in length, with a minimum overhead vertical clearance of seven and six inches (7'-6") feet, except for approved bike lockers and other enclosures, which may be shorter.

(2) All bicycle parking spaces required by this Title must be used solely for the parking of bicycles.

(3) If required bicycle parking facilities are not visible from the street, signs must be posted indicating their location.

(4) Areas used for required bicycle parking must be paved and drained to be reasonably free of mud, dust, and standing water, and must be well-lighted.

(5) Bicycle parking must be designed so that bicycles may be securely locked without undue inconvenience and will be reasonably safeguarded from intentional or accidental damage.

(6) Bicycle parking must be provided at ground level unless an elevator is easily accessible to an approved bicycle storage area.

(7) Bicycle parking must be positioned so as to minimize interference with pedestrian movements and to provide for ADA compliance.

(8) Where required bicycle parking is provided in lockers, the lockers must meet the following standards:

(i) Lockable.

(ii) Capable of fully enclosing the bicycle.

(iii) Securely anchored

(iv) Constructed from a strong, weather-resistant and low-to-no maintenance material.

(v) Clearly labeled as bicycle parking.

(vi) Constructed with doors that open at least ninety (90) degrees to allow easy loading/unloading.

(vii) Posted with information about how to use bicycle lockers (user-provided locks, leasing or sign-up system, smart cards, etc.) on or near the lockers.

(viii) Include a wheel guide tray or other mechanism to assist the user with lifting the bicycle must be provided if lockers or racks are stacked on top of each other.

(9) Required bicycle parking may be provided in floor racks. Wall and ceiling rack designs may be approved by the Director of Planning as part of site plan review. Where required bicycle parking is provided in racks, the racks must meet the following standards:

(i) The bicycle frame and one (1) wheel can be locked to the rack with a high security, U-shaped shackle lock if both wheels are left on the bicycle.

(ii) A bicycle six (6) feet long can be securely held with its frame supported so that the bicycle cannot be pushed or fall in a manner that will damage the bicycle in any way.

(iii) Racks must support the bicycle in at least two (2) places, preventing it from falling over.

(iv) Racks must be anchored so that they cannot be easily removed, solidly constructed, resistant to rust and corrosion, and resistant to hammers and saws.

(10) Parking and maneuvering areas for bicycling parking must meet the following standards:

(i) Each required bicycle parking space must be accessible without moving another bicycle.

(ii) There must be an aisle at least five (5) feet wide behind all required bicycle parking to allow room for bicycle maneuvering. Where the bicycle parking is adjacent to a sidewalk, the maneuvering area may extend into the right-of-way.

(11) Covered bicycle parking can be provided inside buildings, under roof overhangs or awnings, in bicycle lockers, or within or under other structures. Where required covered bicycle parking is not within a building or locker, the cover must be:

(i) Permanent.

(ii) Designed to protect the bicycle from rainfall.

(iii) At least seven (7) feet and six (6) inches above the floor or ground.

(12) All required bicycle parking spaces must be made available to the public as follows:

(i) Required short-term bicycle parking spaces must be available for shoppers, customers, messengers and other visitors to the site.

(ii) Required long-term bicycle parking spaces must be available for employees, students, residents, commuters, and others who remain at the site for several hours.

(13) Alternate designs for bicycle parking may be approved by the Director of Planning as part of site plan review.

B) Arlington County, Virginia:
http://www.commuterpage.com/pages/special-programs/tdm-for-site-plans/bicycle-parking-specifications/

C) Frederick County, Maryland http://frederickcountymd.gov/documents/7/150/BicycleParkingguidelines01192010.PDF

APPENDIX K
Bicycle Safety Education, Encouragement and Enforcement Programs Recommendations

Combined Safety Education & Encouragement Programs

- **BIKE HOWARD at Howard County Public Libraries** – In partnership with Bicycling Advocates of Howard County (BAHC), the Department of Public Works and the Department of Planning and Zoning, the Howard County Libraries would offer a multi-dimensional bicycling education and encouragement program. The program would include the use of posters, bicycle theme readings and book promotion, provision of covered bicycle parking, incentives for biking to the library, hosting bicycle repair classes, and use of parking lots for bicycle safety courses and youth rodeos. Additionally a joint online and physical library of local resources could be created including ride tip sheets, maps, brochures and indexes to other bicycle related information.

- **Receive a Bicycle-Friendly Community Designation from the League of American Bicyclists** – BAHC has prepared a draft application for this designation (January 2013). Upon receiving the initial LAB response to the first application, a public and private partnership should be formed to pursue a bronze level designation within five years (by 2018) the partnership should include CA, key county agencies, any Bicycle Friendly Businesses within the county and BAHC.

- **Establish a countywide Safe Routes to School Program (SRTS)** – The County should adopt a goal, such as to have 50% of elementary and middle schools participating in SRTS activities by 2018. To reach this goal and guide school activities the Howard County Public Schools (including the school board) would lead a joint effort that would also include the Howard County Police and Department of Public Works. The program would target schools with the greatest potential for biking and walking to school, i.e. they have the highest percentage of students living within a one-mile radius of the school. The program would promote and coordinate the following activities:
    - Participation in annual Walk and Bike to School Days.
    - Adoption of a school curriculum (many are already developed) which would educate students about safe walking and biking practices, including the importance of wearing reflective hear to be visible when its dark.
    - Education of bus drivers about the recently established Maryland 3 foot rule and other aspects of safe driving around cyclists.
    - Creation of incentive programs to encourage more students to bicycle to school;
    - Provision of high quality covered bicycle parking at schools in responds to demand as it increases.

- **Establish a *Share-the-Path Safety and Respect* program**—This program would be designed to accomplish three main goals: 1) reduce user conflicts on CA and County paths, many of which are quite narrow, 2) foster unity and social cohesion among path users and supporters, 3) use that unity to continue to advocate for path widening, safer road crossings, wayfinding signs and a host of other needed upgrades to make the path system safe and functional for transportation and recreation. This initiative would be lead by a partnership including Columbia Association the County Department of Recreation and Parks, and representatives from a variety of path users groups, village councils, and HOAs. The activities would include promoting safe practices and mutual respect among pedestrians and bicyclists using the trail system. For example, the program would educate pedestrians and bicyclists about the use of headphones and lights, keeping to the right, passing left, providing an audible warning when passing, yielding to pedestrians, and keeping dogs on a "short leash".

Other Encouragement Programs

- **Establish an active living partnership** – This initiative would target those agencies, businesses and institutions promoting health and wellness including the Howard County Dept. of Public Health, Hospitals, practitioner associations, Johns Hopkins, the Horizon Foundation, private gyms, CA and County recreation centers and programs, etc. These organizations could implement various programs promoting bicycling for heath, including prescriptions for outdoor activity and sponsoring a special event in each of the four seasons of the year, targeted to specific at-risk populations.

- **Expand the bicycling-related elements of the County's existing TDM program** – the County should expand its existing Commuter Solutions Howard program and multimodal commuting reimbursement program, through which local employers receive an incentive to promote the use of transit, walking and bicycling for commuting purposes. This program currently promotes bicycling as alternative transportation; promotes federal bicycling benefit of $20, facilitates bike to work events; and facilitates the bicycle friendly applications to the LAB. Additionally, the County should encourage bicycling by adding it to its list of employee benefits initiatives targeted through its TDM program.

- **Establish a Howard County "Bike-about"** – following the example of the Columbia Association and tied to the County's economic development plans, the "bike-about" program would designate certain days of the year to have a "celebration" on wheels which would help Howard County residents, rediscover where they live. The initiative would be based on County Council districts and would help increase awareness of bicycling throughout Howard County.

Enforcement

- **Analyze and publicize bicycling crash data** – through this program, the County Police would work with Public Works and DPZ to create an annual report about bicycle crashes. Hospital Emergency Rooms should also be asked to share their data regarding visits related to bicycling crashes. By regularly reporting this data other agencies and the public can be informed of the magnitude of this problem (currently very small) and track changes and trends over time. Analysis of the data may help in the design and implementation of bike safety programs involving both physical accommodations and education programs.

- **Establish a Bicycle-Mounted Police program** – as Downtown Columbia and other more compact locations like Ellicott City and Laurel continue their transformation into more walkable and bikeable communities, the County should consider expanding its bicycle-mounted police patrols which will help motorists learn how to safely maneuver around bicycles by increasing the presence of bicyclists in the area. Additionally, as the County begins to create awareness of bicycling issues, an increased enforcement of laws for motorists and bicyclists will be needed.

APPENDIX L

Cost Estimate Methodology

Planning level cost estimates have been developed for vast majority of recommendations included in this master plan; they are listed below. There are however, some types of improvements that are quite variable in cost, due to the range of design choices within the facility category and the site specific conditions. For these facilities only a range of potential costs can be provided at the master plan level.

Recommended On-Road Facilities and Accommodations

- Shared Roadways--sufficient for bicycling without further improvement.
- Paved and Striped Shoulders
- Shared Lane Markings (Sharrows)
- Bike Lanes-- including standard bike lanes, buffered bike lanes, advisory bike lanes, and colored bike lanes.
- Shared Road with Safety Treatments--should be understood as a variable set of treatments rather than a facility type, per se. Typically for rural roads; uses safety signs, shared lane markings and other treatments such as short shoulder sections to allow cars to pass bikes on hills.
- Neighborhood Greenway – Residential collector street with bicycle-friendly traffic calming to create a low stress bikeway on the roadway.

Recommended Off-Road Facilities and Accommodations

- Shared-Use Path-- sometimes referred to as a trail, sidepath or path.
- One-Way Cycletrack-- a one-way bicycle facility physically separated from moving traffic and pedestrians.
- Two-Way Cycletrack-- a two-way bicycle facility (in the median of the roadway, or on one side) physically separated from moving traffic and pedestrians.
- Sidewalk with Bikes Allowed—standard sidewalk made wide enough for two cyclists or a cyclist and pedestrian to safely pass at a low speed (6 feet).

Spot Improvements

- Bike Link —Includes a variety improvements to allow bicycle linkage between streets, including removal of gates or other barriers, providing curb cuts or ramps, providing access through a public or private parking lot, adding a short segment of sidewalk or asphalt path (< 500 feet) through an institutional property.
- Trail Access-- Includes a variety improvements to allow bicycle access to a trail system, such as a short segment of sidewalk or asphalt path (< 500 feet), a stairway with a bicycle channel, curb ramps, gate removal, etc.
- New Bridge – recommended new bridge over a major road, railroad or stream
- New Tunnel – recommended new tunnel or underpass under a major road
- Crossing Improvement—recommended safety improvement for bicyclists at road/road or road/trail intersections; i.e. curb ramps, crosswalks, special striping, pocket bike lanes, colored bike lanes, crossing islands, bike boxes, warning signs, signal modifications, bike signals, changes to existing curb radii, slip lane design, or vehicular travel lanes, etc.

Methodology

For most of the recommended improvements in the bicycle network, planning level cost estimates were developed in a two step process: first by identifying the relevant pay items needed for the facility, and second, by establishing rough quantities for each individual recommendation. The quantities were

determined by applying standard facility design requirements and calculating the length of recommended facility as drawn in GIS.

Unit costs for pay items[1] are based on 2011 dollars with an inflation adjustment of three percent per year (compounded) to provide 2013 costs. Unit costs for pay items were taken from three sources--construction cost estimates provided by the County , the Howard County Department of Public Works Project Development Cost Estimate Form (adjusted for inflation) provided by the County , and cost data from state departments of transportation and other sources. Engineering experience and knowledge of current practice in the field was used to determine which unit cost would be most accurate for today's Maryland market.

Rough costs were assigned to some general categories such as utility adjustments, drainage, and maintenance of traffic. It should be noted that these costs can vary widely depending on the nature of the work ultimately required for each individual project location.

The cost estimates provided are intended for general planning and county budgeting purposes. Construction costs for each project will vary based on the ultimate project scope at the time of implementation, conditions specific to each project, and the economic conditions at the time of construction. These costs are provided in 2013 dollars and additional inflation adjustments will be needed for projects undertaken in future years.

It is also important to note that in many cases, detailed design will be needed for many of the recommended facilities and treatments. The costs estimates provided do not include the cost of additional project planning, engineering analysis and design, Right-of-Way acquisition, or the cost for ongoing maintenance.

Assumptions

To provide planning cost estimates for the recommended facilities included in this Plan, certain baseline assumptions were made for each facility type. These are not provided as design criteria, but rather as assumptions used for cost estimating:

On-Road Facilities

- Bike Lane –5 ft wide.
- Buffered Bike Lanes –8 ft wide; a 5 ft wide bicycle lane and a 3 ft striped buffered zone.
- Shared Lane Marking (Sharrow) –standard dimension and spacing specified in the AASHTO Bicycle Facility Planning and Design Guide.
- Climbing Lane – 1 bike lane, width 5 ft wide and the shared lane marking in one lane.
- Paved and Striped Shoulder – 4 ft wide.
- Shared Roadway with Safety Treatment – Because these treatments are highly variable based upon each particular road segment and which treatments/improvements are selected, we are providing a ballpark cost estimate of $150,000 per mile.

Off-Road Facilities

- Sidewalk with Bikes Permitted – 6 ft wide; constructed of concrete.

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[1] A pay item is a standard item of construction with an associated cost that is used in the engineering and design industry to make cost estimates and develop bid documents for construction of transportation or other facilities.

- One way Cycletrack – 7 ft. with curb & gutter on one side and a 3 foot median on the other. Includes standard striping and marking. Estimate does not include sidewalk for pedestrians or buffer enhancements on either sides, i.e. trees, planters, bollards, etc. Double the cost of a single one way cycletrack to provide one on each side of a two-way street.
- Two-way Cycle Track –10 ft. with curb & gutter on one side and a 3 foot median on the other with standard striping and marking.
- Shared Use Path –10 ft wide paved in asphalt.

Spot Improvements

Spot improvements vary greatly in context, nature, scope and magnitude. Some locations in the network represent a simple curb ramp, others may represent complete re-design of an intersection, still others may represent a bridge over a major highway such as Route 29 or I-95. For this reason, we are providing a range of costs for these activities/facilities. Using the project Level of Effort rating, we have provided range of costs for each of three Levels of Effort categories (LOE): Low, Medium and High.

• Low LOE, Bike Links and Trail Access Improvements	$5,000 - $50,000
• Low LOE Crossing Improvements	$50,000 - $100,000
• Medium LOE, All facility types	$100,000 – $150,000
• High LOE, All facility types (not bridges)	$150,000 - $300,000
• Medium or High LOE, Bridge over stream	$300,000 - $500,000
• High LOE, Bridge over highway	$3 - $10 million

Nineteen detailed cost estimate work sheets are provided to address a wide range of facility type and implementation action combinations.

BIKE HOWARD

Howard County Bicycle Master Plan

Facility Base Costs (per mile)

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Compounding inflation of assumes 3% per year

1 Signed Route (Add Signs)

Item	Unit	Quantity	2011 Unit Cost	2013 Compound Unit Cost	Total Cost 2013	Comment
New Sign	EA	10	$220.00	$233.00	$2,330	Assume 1 Sign every 500 feet, each direction
Lump Sum Items						
Maintenance of Traffic (5%)	LS	1.00		$233.00	$233	
				Subtotal	$2,563	
			25% Contingency		$641	
			Total Estimated Cost		$3,300	← 2 Lanes $0.63 Per Foot $3,300 Per Mile

2 Sharrows (No Major Action/Add Markings)

Item	Unit	Quantity	2011 Unit Cost	2013 Compound Unit Cost	Total Cost 2013	Comment
Thermoplastic Pavement Marking Symbol	EA	20	$300.00	$318.00	$6,360	Assume 1 Symbol every 250 feet per side of the road
New Sign	EA	10	$220.00	$233.00	$2,330	Assume 1 Sign every 500 feet
Lump Sum Items						
Maintenance of Traffic (5%)	LS	1.00	$410.00	$435.00	$435	
				Subtotal	$9,125	
25% Contingency					$2,281	
Total Estimated Cost					$11,500	← 2 Lanes $2.18 Per Foot $11,500 Per Mile

3 Bike Lanes (No Major Action/Add Striping)

Item	Unit	Quantity	2011 Unit Cost	2013 Compound Unit Cost	Total Cost 2013	Comment
Thermoplastic Pavement Marking (6")	LF	20000	$1.50	$1.59	$31,800	Assume 4 lines entire length
Thermoplastic Pavement Marking Symbol	EA	40	$300.00	$318.00	$12,720	Assume 1 Symbol every 250 feet each side of road
24" Thermoplastic Pavement Marking	LF	200	$6.00	$6.36	$1,272	Assume 1 High Vis crossing every 2500 feet
New Sign	EA	10	$220.00	$233.00	$2,330	Assume 1 Sign every 500 feet each side of road
Lump Sum Items						
Maintenance of Traffic (5%)	LS	1.00	$2,270.00	$2,406.00	$2,406	
				Subtotal	$50,528	
			25% Contingency		$12,632	
			Total Estimated Cost		$63,200	← 2 Lanes $11.97 Per Foot $63,200 Per Mile

Facility Base Costs (per mile)

Wednesday, April 10, 2013

Compounding inflation of assumes 3% per year

4 **Bike Lanes (Lane Diet)**

Item	Unit	Quantity	2011 Unit Cost	2013 Compound Unit Cost	Total Cost 2013	Comment
Thermoplastic Pavement Marking (6")	LF	20000	$1.50	$1.59	$31,800	Assume 4 lines entire length (2 white edge)
Thermoplastic Pavement Marking Symbol	EA	20	$300.00	$318.00	$6,360	Assume 1 Symbol every 250 feet each side of road
24" Thermoplastic Pavement Marking	LF	100	$6.00	$6.36	$636	Assume 1 High Vis crossing every 2500 feet
New Sign	EA	5	$220.00	$233.00	$1,165	Assume 1 Sign every 500 feet
Eradication	LF	10000	$2.00	$1.50	$15,000	Assume 4 lines entire length (mixed edge and center lines)
Lump Sum Items						
Maintenance of Traffic (5%)	LS	1.00	$2,885.00	$2,748.00	$2,748	
				Subtotal	$57,709	
			25% Contingency		$14,427	
			Total Estimated Cost		$72,200	← 2 Shoulders $13.67 Per Foot $72,200 Per Mile

5 **Bike Lanes (Road Diet)**

Item	Unit	Quantity	2011 Unit Cost	2013 Compound Unit Cost	Total Cost 2013	Comment
Thermoplastic Pavement Marking (6")	LF	20000	$1.50	$1.59	$31,800	Assume 4 lines entire length
Thermoplastic Pavement Marking Symbol	EA	40	$300.00	$318.00	$12,720	Assume 1 Symbol every 250 feet each side of road (bike lane)
24" Thermoplastic Pavement Marking	LF	200	$6.00	$6.36	$1,272	Assume 1 High Vis crossing every 2500 feet
New Sign	EA	10	$220.00	$233.00	$2,330	Assume 1 Sign every 500 feet
Eradication	LF	15000	$2.00	$1.50	$22,500	Assume 3 lines entire length (2 center yellow, 1 50% skip yellow)
Thermoplastic Pavement Marking Symbol	EA	20	$300.00	$318.00	$6,360	Assume 1 symbol every 250 feet (Left-Turn arrows)
Lump Sum Items						
Maintenance of Traffic (5%)	LS	1.00	$4,070.00	$3,849.00	$3,849	
				Subtotal	$80,831	
			25% Contingency		$20,208	
			Total Estimated Cost		$101,100	← 2 Lanes $19.15 Per Foot $101,100 Per Mile

BIKE HOWARD

Howard County Bicycle Master Plan

Facility Base Costs (per mile)

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6 Bike Lanes (Pave Existing Shoulders - 5' each side)

Compounding inflation of assumes 3% per year

Item	Unit	Quantity	2011 Unit Cost	2013 Compound Unit Cost	Total Cost 2013	Comment
Milling	SY	5900	$6.00	$6.00	$35,400	Assume 10 feet width
Asphalt Surface Course	TON	500	$60.00	$64.00	$32,000	Assume 10 feet width and 0.125 feet depth, 13.3 CF in a TON
Eradication	LF	10000	$2.00	$2.12	$21,200	Assume 2 lines entire length (2 white edge lines)
Thermoplastic Pavement Marking (6")	LF	10000	$1.50	$1.59	$15,900	Assume 2 lines entire length
Thermoplastic Pavement Marking Symbol	EA	40	$300.00	$318.00	$12,720	Assume 1 Symbol every 250 feet each side of road (bike lane)
24" Thermoplastic Pavement Marking	LF	200	$6.00	$6.36	$1,272	Assume 1 High Vis crossing every 2500 feet
New Sign	EA	10	$220.00	$233.00	$2,330	Assume 1 Sign every 500 feet
Lump Sum Items						
Landscaping (5%)	LS	1.00	$3,250.00	$3,455.00	$3,455	
Drainage and E&S (10%)	LS	1.00	$6,500.00	$6,910.00	$6,910	
Maintenance of Traffic (5%)	LS	1.00	$3,250.00	$3,455.00	$3,455	
Utility Adjustments (10%)	LS	1.00	$6,500.00	$6,910.00	$6,910	
				Subtotal	**$141,552**	
25% Contingency					$35,388	
Total Estimated Cost					**$177,000**	← 2 Shoulders $33.52 Per Foot $177,000 Per Mile

7 Bike Lanes (Widen Road/Construct Shoulders - 5' each side)

Item	Unit	Quantity	2011 Unit Cost	2013 Compound Unit Cost	Total Cost 2013	Comment
Earthwork, Excavation, Grading	CY	3750	$15.00	$25.00	$93,750	Assume 10 feet width and 2 feet depth
Aggregate Base Course for Pavement	CY	2000	$50.00	$60.00	$120,000	Assume 10 feet width and 1 feet depth
Milling	SY	5900	$6.00	$6.00	$35,400	Assume 10 feet width
Asphalt Surface Course	TON	500	$60.00	$64.00	$32,000	Assume 10 feet width and 0.125 feet depth, 13.3 CF in a TON
Eradication	LF	10000	$2.00	$2.12	$21,200	Assume 2 lines entire length (2 white edge lines)
Thermoplastic Pavement Marking (6")	LF	10000	$1.50	$1.59	$15,900	Assume 2 lines entire length
Thermoplastic Pavement Marking Symbol	EA	40	$300.00	$318.00	$12,720	Assume 1 Symbol every 250 feet each side of road (bike lane)
24" Thermoplastic Pavement Marking	LF	200	$6.00	$6.36	$1,272	Assume 1 High Vis crossing every 2500 feet
New Sign	EA	10	$220.00	$233.00	$2,330	Assume 1 Sign every 500 feet
Lump Sum Items						
Landscaping (5%)	LS	1.00	$3,250.00	$3,455.00	$3,455	
Drainage and E&S (10%)	LS	1.00	$6,500.00	$6,910.00	$6,910	
Maintenance of Traffic (5%)	LS	1.00	$3,250.00	$3,455.00	$3,455	
Utility Adjustments (10%)	LS	1.00	$6,500.00	$6,910.00	$6,910	
				Subtotal	**$355,302**	
25% Contingency					$88,826	
Total Estimated Cost					**$444,200**	← 2 Shoulders $84.13 Per Foot $444,200 Per Mile

Facility Base Costs (per mile)

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Compounding inflation of assumes 3% per year

8 **Climbing Lane (Lane Diet)**

Item	Unit	Quantity	2011 Unit Cost	2013 Compound Unit Cost	Total Cost 2013	Comment
Thermoplastic Pavement Marking (6")	LF	20000	$1.50	$1.59	$31,800	Assume 4 lines entire length (2 white edge, 2 center yellow)
Thermoplastic Pavement Marking Symbol	EA	40	$300.00	$318.00	$12,720	Assume 1 Symbol every 250 feet each side of road
24" Thermoplastic Pavement Marking	LF	200	$6.00	$6.36	$1,272	Assume 1 High Vis crossing every 2500 feet
New Sign	EA	10	$220.00	$233.00	$2,330	Assume 1 Sign every 500 feet
Eradication	LF	20000	$2.00	$1.50	$30,000	Assume 4 lines entire length (mixed edge and center lines)
Lump Sum Items						
Maintenance of Traffic (5%)	LS	1.00	$4,270.00	$3,906.00	$3,906	
				Subtotal	**$82,028**	
			25% Contingency		$20,507	
			Total Estimated Cost		**$102,600**	← **2 Shoulders $19.43 Per Foot $102,600 Per Mile**

9 **Buffered Bike Lane - Lane Diet**

Item	Unit	Quantity	2011 Unit Cost	2013 Compound Unit Cost	Total Cost 2013	Comment
Thermoplastic Pavement Marking (6")	LF	30000	$1.50	$1.59	$47,700	Assume 6 lines entire length (4 white edge, 2 center yellow)
Thermoplastic Pavement Marking Symbol	EA	60	$300.00	$318.00	$19,080	Assume 1 Symbol every 250 feet each side of road
24" Thermoplastic Pavement Marking	LF	300	$6.00	$6.36	$1,908	Assume 1 High Vis crossing every 2500 feet
New Sign	EA	15	$220.00	$233.00	$3,495	Assume 1 Sign every 500 feet
Eradication	LF	30000	$2.00	$1.50	$45,000	Assume 4 lines entire length (mixed edge and center lines)
Lump Sum Items						
Maintenance of Traffic (5%)	LS	1.00	$6,405.00	$5,859.00	$5,859	
				Subtotal	**$123,042**	
			25% Contingency		$30,761	
			Total Estimated Cost		**$153,900**	← **2 Shoulders $29.15 Per Foot $153,900 Per Mile**

BIKE HOWARD

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Facility Base Costs (per mile)

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Compounding inflation of assumes 3% per year

10 **Paved and Striped Shoulder (Add Striping)**

Item	Unit	Quantity	2011 Unit Cost	2013 Compound Unit Cost	Total Cost 2013	Comment
Thermoplastic Pavement Marking (6")	LF	10000	$1.50	$1.59	$15,900	Assume 2 lines entire length
New Sign	EA	10	$220.00	$233.00	$2,330	Assume 1 Sign every 500 feet each side of road
Lump Sum Items						
Maintenance of Traffic (5%)	LS	1.00	$860.00	$912.00	$912	
				Subtotal	$19,142	
			25% Contingency		$4,786	
			Total Estimated Cost		$24,000	← 2 Lanes $4.55 Per Foot $24,000 Per Mile

11 **Paved and Striped Shoulder (Lane Diet)**

Item	Unit	Quantity	2011 Unit Cost	2013 Compound Unit Cost	Total Cost 2013	Comment
Thermoplastic Pavement Marking (6")	LF	10000	$1.50	$1.59	$15,900	Assume 2 lines entire length (2 white edge)
Eradication	LF	20000	$2.00	$1.50	$30,000	Assume 4 lines entire length (mixed edge and center lines)
Lump Sum Items						
Maintenance of Traffic (5%)	LS	1.00	$2,750.00	$2,295.00	$2,295	
				Subtotal	$48,195	
			25% Contingency		$12,049	
			Total Estimated Cost		$60,300	← 2 Shoulders $11.42 Per Foot $60,300 Per Mile

12 **Paved and Striped Shoulders (Road Diet)**

Item	Unit	Quantity	2011 Unit Cost	2013 Compound Unit Cost	Total Cost 2013	Comment
Thermoplastic Pavement Marking (6")	LF	20000	$1.50	$1.59	$31,800	Assume 4 lines entire length
Thermoplastic Pavement Marking Symbol	EA	40	$300.00	$318.00	$12,720	Assume 1 Symbol every 250 feet each side of road (bike lane)
24" Thermoplastic Pavement Marking	LF	200	$6.00	$6.36	$1,272	Assume 1 High Vis crossing every 2500 feet
New Sign	EA	10	$220.00	$233.00	$2,330	Assume 1 Sign every 500 feet
Eradication	LF	13300	$2.00	$1.50	$19,950	Assume 2.66 lines entire length (2 center yellow, 2x 0.33 skip dash white)
Thermoplastic Pavement Marking Symbol	EA	20	$300.00	$318.00	$6,360	Assume 1 symbol every 250 feet (Left-Turn arrows)
Lump Sum Items						
Maintenance of Traffic (5%)	LS	1.00	$3,900.00	$3,722.00	$3,722	
				Subtotal	$78,154	
			25% Contingency		$19,539	
			Total Estimated Cost		$97,700	← 2 Shoulders $18.50 Per Foot $97,700 Per Mile

Facility Base Costs (per mile)

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Compounding inflation of assumes 3% per year

13 **Paved and Striped Shoulders (Build Shoulders - 2' each side)**

Item	Unit	Quantity	2011 Unit Cost	2013 Compound Unit Cost	Total Cost 2013	Comment
Earthwork, Excavation, Grading	CY	1500	$15.00	$25.00	$37,500	Assume 4 feet width and 2 feet depth
Aggregate Base Course for Pavement	CY	800	$50.00	$60.00	$48,000	Assume 4 feet width and 1 feet depth
Asphalt Surface Course	TON	200	$60.00	$64.00	$12,800	Assume 4 feet width and 0.125 feet depth, 13.3 CF in a TON
Asphalt Base Course	TON	800	$60.00	$64.00	$51,200	Assume 4 feet width and 0.5 feet depth, 13.3 CF in a TON
Lump Sum Items						
Landscaping (5%)	LS	1.00	$6,125.00	$7,475.00	$7,475	
Drainage and E&S (10%)	LS	1.00	$12,250.00	$14,950.00	$14,950	
Maintenance of Traffic (5%)	LS	1.00	$6,125.00	$7,475.00	$7,475	
Utility Adjustments (10%)	LS	1.00	$12,250.00	$14,950.00	$14,950	
				Subtotal	$194,350	
			25% Contingency		$48,588	
			Total Estimated Cost		$243,000	← 2 Shoulders $46.02 Per Foot $243,000 Per Mile

14 **Paved Shoulders (Build Shoulders - 4' each side)**

Item	Unit	Quantity	2011 Unit Cost	2013 Compound Unit Cost	Total Cost 2013	Comment
Earthwork, Excavation, Grading	CY	3000	$15.00	$25.00	$75,000	Assume 8 feet width and 2 feet depth
Aggregate Base Course for Pavement	CY	1600	$50.00	$60.00	$96,000	Assume 8 feet width and 1 feet depth
Asphalt Surface Course	TON	400	$60.00	$64.00	$25,600	Assume 8 feet width and 0.125 feet depth, 13.3 CF in a TON
Asphalt Base Course	TON	1600	$60.00	$64.00	$102,400	Assume 8 feet width and 0.5 feet depth, 13.3 CF in a TON
Thermoplastic Pavement Marking (6")	LF	10000	$1.50	$1.59	$15,900	Assume 2 lines entire length
Lump Sum Items						
Landscaping (5%)	LS	1.00	$13,000.00	$15,745.00	$15,745	
Drainage and E&S (10%)	LS	1.00	$26,000.00	$31,490.00	$31,490	
Maintenance of Traffic (5%)	LS	1.00	$13,000.00	$15,745.00	$15,745	
Utility Adjustments (10%)	LS	1.00	$26,000.00	$31,490.00	$31,490	
				Subtotal	$409,370	
			25% Contingency		$102,343	
			Total Estimated Cost		$511,800	← 2 Shoulders $96.93 Per Foot $511,800 Per Mile

Facility Base Costs (per mile)

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15 **Sidewalk with Bikes Permitted (Widen Existing - 2' concrete)**

Compounding inflation of assumes 3% per year

Item	Unit	Quantity	2011 Unit Cost	2013 Compound Unit Cost	Total Cost 2013	Comment
Earthwork, Excavation, Grading	CY	750	$15.00	$25.00	$18,750	Assume 2 feet width and 2 feet depth
Aggregate Base Course for Pavement	CY	400	$50.00	$60.00	$24,000	Assume 2 feet width and 1 feet depth
Concrete Surface Course	TON	100	$60.00	$64.00	$6,400	Assume 2 feet width and 0.125 feet depth, 13.3 CF in a TON
Concrete Base Course	TON	400	$60.00	$64.00	$25,600	Assume 2 feet width and 0.5 feet depth, 13.3 CF in a TON
Lump Sum Items						
Landscaping (5%)	LS	1.00	$3,063.00	$3,738.00	$3,738	
Drainage and E&S (10%)	LS	1.00	$6,125.00	$7,475.00	$7,475	
Maintenance of Traffic (5%)	LS	1.00	$3,063.00	$3,738.00	$3,738	
Utility Adjustments (10%)	LS	1.00	$6,125.00	$7,475.00	$7,475	
				Subtotal	**$97,176**	
			25% Contingency		$24,294	
			Total Estimated Cost		**$121,500**	← **2 Lanes $23.01 Per Foot $121,500 Per Mile**

16 **Sidewalk w Bikes Permitted (Construct New- 6' concrete)**

Item	Unit	Quantity	2011 Unit Cost	2013 Compound Unit Cost	Total Cost 2013	Comment
Earthwork, Excavation, Grading	CY	4100	$15.00	$25.00	$102,500	Assume 6 feet width and 2 feet depth
Aggregate Base Course for Pavement	CY	1000	$50.00	$60.00	$60,000	Assume 6 feet width and 1 feet depth
Concrete Surface Course	TON	250	$60.00	$64.00	$16,000	Assume 6 feet width and 0.125 feet depth, 13.3 CF in a TON
Concrete Base Course	TON	1000	$60.00	$64.00	$64,000	Assume 6 feet width and 0.5 feet depth, 13.3 CF in a TON
Lump Sum Items						
Landscaping (5%)	LS	1.00	$9,325.00	$12,125.00	$12,125	
Drainage and E&S (10%)	LS	1.00	$18,650.00	$24,250.00	$24,250	Note: Does not include enhanced features such as: waysides, signals, crosswalks, signs, lighting, structures, etc.
Maintenance of Traffic (5%)	LS	1.00	$9,325.00	$12,125.00	$12,125	
Utility Adjustments (10%)	LS	1.00	$18,650.00	$24,250.00	$24,250	
				Subtotal	**$315,250**	
			25% Contingency		$78,813	
			Total Estimated Cost		**$394,100**	← **2 Lanes $74.64 Per Foot $394,100 Per Mile**

Facility Base Costs (per mile)

Wednesday, April 10, 2013

Compounding inflation of assumes 3% per year

17 **Shared Use Path (Widen Existing- 4' asphalt)**

Item	Unit	Quantity	2011 Unit Cost	2013 Compound Unit Cost	Total Cost 2013	Comment
Earthwork, Excavation, Grading	CY	2600	$15.00	$25.00	$65,000	Assume 10 feet width and 2 feet depth
Aggregate Base Course for Pavement	CY	400	$50.00	$60.00	$24,000	Assume 4 feet width and 1 feet depth
Asphalt Surface Course	TON	100	$60.00	$64.00	$6,400	Assume 4 feet width and 0.125 feet depth, 13.3 CF in a TON
Asphalt Base Course	TON	400	$60.00	$64.00	$25,600	Assume 4 feet width and 0.5 feet depth, 13.3 CF in a TON
Lump Sum Items						
Landscaping (5%)	LS	1.00	$4,450.00	$6,050.00	$6,050	
Drainage and E&S (10%)	LS	1.00	$8,900.00	$12,100.00	$12,100	Note: Does not include enhanced features such as: waysides, signals, crosswalks, signs, lighting, structures, etc.
Maintenance of Traffic (5%)	LS	1.00	$4,450.00	$6,050.00	$6,050	
Utility Adjustments (10%)	LS	1.00	$8,900.00	$12,100.00	$12,100	
				Subtotal	$157,300	
			25% Contingency		$39,325	
			Total Estimated Cost		$196,700	← $37.25 Per Foot
						$196,700 Per Mile

18 **Shared Use Path (Construct New - 10' asphalt)**

Item	Unit	Quantity	2011 Unit Cost	2013 Compound Unit Cost	Total Cost 2013	Comment
Earthwork, Excavation, Grading	CY	6500	$15.00	$25.00	$162,500	Assume 16 feet width and 2 feet depth
Aggregate Base Course for Pavement	CY	1000	$50.00	$60.00	$60,000	Assume 10 feet width and 1 feet depth
Asphalt Surface Course	TON	250	$60.00	$64.00	$16,000	Assume 10 feet width and 0.125 feet depth, 13.3 CF in a TON
Asphalt Base Course	TON	1000	$60.00	$64.00	$64,000	Assume 10 feet width and 0.5 feet depth, 13.3 CF in a TON
Lump Sum Items						
Landscaping (5%)	LS	1.00	$11,125.00	$15,125.00	$15,125	
Drainage and E&S (10%)	LS	1.00	$22,250.00	$30,250.00	$30,250	Note: Does not include enhanced features such as: waysides, signals, crosswalks, signs, lighting, structures, etc.
Maintenance of Traffic (5%)	LS	1.00	$11,125.00	$15,125.00	$15,125	
Utility Adjustments (10%)	LS	1.00	$22,250.00	$30,250.00	$30,250	
				Subtotal	$393,250	
			25% Contingency		$98,313	
			Total Estimated Cost		$491,600	← $93.11 Per Foot
						$491,600 Per Mile

Facility Base Costs (per mile)

Wednesday, April 10, 2013

Compounding inflation of assumes 3% per year

19 **One Way Cycletrack (Construct New - 7' asphalt w/ curb & gutter & median)**

Item	Unit	Quantity	2011 Unit Cost	2013 Compound Unit Cost	Total Cost 2013	Comment
Earthwork, Excavation, Grading	CY	5100	$15.00	$25.00	$127,500	Assume 13 feet (One 7 ft lane with 3 feet excavation each side) and 2 feet depth
Aggregate Base Course for Pavement & Median	CY	1000	$50.00	$60.00	$60,000	Assume 10 feet width and 1 feet depth
Asphalt Surface Course	TON	250	$60.00	$64.00	$16,000	Assume 10 feet width and 0.125 feet depth, 13.3 CF in a TON
Asphalt Base Course	TON	1000	$60.00	$64.00	$64,000	Assume 10 feet width and 0.5 feet depth, 13.3 CF in a TON
Curb & Gutter / Small Median (3')	LF	10000	$55.00	$58.00	$580,000	
Thermoplastic Pavement Marking Symbol	EA	20	$300.00	$318.00	$6,360	Assume 1 symbol every 250 feet (bike lanes)
New Sign	EA	10	$220.00	$233.00	$2,330	Assume 1 Sign every 500 feet each side of Cycletrack
Lump Sum Items						
Landscaping (5%)	LS	1.00	$37,875.00	$42,693.00	$42,693	
Drainage and E&S (10%)	LS	1.00	$75,750.00	$85,386.00	$85,386	
Maintenance of Traffic (5%)	LS	1.00	$37,875.00	$42,693.00	$42,693	
Utility Adjustments (10%)	LS	1.00	$75,750.00	$85,386.00	$85,386	
				Subtotal	**$1,112,348**	
			25% Contingency		$278,087	
			Total Estimated Cost		**$1,390,500**	← **2 Lanes $263.35 Per Foot $1,390,500 Per Mile**

Note: $2,781,000 per mile, to provide a one way cycletrack on each side of a two way road.

20 **Two Way Cycletrack (Construct New - 10' asphalt w/ curb & gutter & median)**

Item	Unit	Quantity	2011 Unit Cost	2013 Compound Unit Cost	Total Cost 2013	Comment
Earthwork, Excavation, Grading (Item 12)	CY	6300	$15.00	$25.00	$157,500	Assume 16 feet width (two 5 ft lanes plus 3 ft excavation each side) and 2 feet depth
Aggregate Base Course for Pavement (Item 44)	CY	1200	$50.00	$60.00	$72,000	Assume 10 feet width and 1 feet depth
Asphalt Surface Course	TON	300	$60.00	$64.00	$19,200	Assume 10 feet width and 0.125 feet depth, 13.3 CF in a TON
Asphalt Base Course	TON	1200	$60.00	$64.00	$76,800	Assume 10 feet width and 0.5 feet depth, 13.3 CF in a TON
Curb & Gutter / Small Median (3')	LF	10000	$55.00	$58.00	$580,000	
Thermoplastic Pavement Marking (6")	LF	1300	$1.50	$1.59	$2,067	Assume 1 dashed center line, yellow)
Thermoplastic Pavement Marking (6")	LF	2500	$1.50	$2.00	$5,000	Assume 0.5 line entire length
Thermoplastic Pavement Marking Symbol	EA	20	$300.00	$318.00	$6,360	Assume 1 symbol every 250 feet (bike lanes)
New Sign	EA	10	$220.00	$233.00	$2,330	Assume 1 Sign every 500 feet each side of Cycletrack
Lump Sum Items						
Landscaping (5%)	LS	1.00	$40,310.00	$45,946.00	$45,946	
Drainage and E&S (10%)	LS	1.00	$80,620.00	$91,893.00	$91,893	
Maintenance of Traffic (5%)	LS	1.00	$40,310.00	$45,946.00	$45,946	
Utility Adjustments (10%)	LS	1.00	$80,620.00	$91,893.00	$91,893	
				Subtotal	**$1,196,935**	**$198.91**
			25% Contingency		$299,234	
			Total Estimated Cost		**$1,496,200**	← **2 Lanes $283.37 Per Foot $1,496,200 Per Mile**

APPENDIX M

Funding Sources

State

The State of Maryland has several funding programs that support the construction and maintenance of bicycle and walking facilities.

Highway User Revenues (HURs) are collected by the state and are distributed to localities. These revenues are usually spent on vehicular transportation projects such as roadways and bridges. They can used for the construction and maintenance of footpaths, bridle paths or horse paths, as well as bicycle trails (Article 66B Title 2 Department of Transportation Subtitle 4 Highway User Revenues 8-409).

Maryland Bikeways Program is a relatively new program operated out of the Maryland Department of Transportation Office of Planning and Capital Programming. The program funds three types of projects: Minor Retrofit projects of up to $100,000; Design and Feasibility Analysis projects focused on closing key gaps in local or state bikeway or trail networks, and Construction of on-road or off-road facilities. Project eligibility is described as follows:

- Minor Retrofit --including bicycle route signing, pavement markings, parking, drainage grate replacement and other minor retrofits to enhance bicycle routes.
- Feasibility Assessment and Design of proposed or potential bikeways --to assess issues, such as environmental impacts, right-of-way issues, ADA compatibility, local support, and cost estimates.
- Construction of bikeways-- generally leveraging other sources of funding, such as Transportation Enhancements, Maryland Heritage Areas, etc.

Only public agencies are eligible to apply for Bikeways Program funding. Program criteria and requirements are in place to target the Bikeways Program to priority areas. More detail on the targeted areas and other program criteria and requirements is provided in the funding application instructions.

Bicycle Retrofit Program was initiated by the State Highway Administration in 2000. The purpose of the program is to fund minimal on-road improvements on state highways that would benefit bicycling. Eligible improvements include projects that can be completed quickly and without the need for permits or right-of-way. One million dollars is allocated annually to the Bicycle Retrofit Program. Individuals and local jurisdictions can submit project requests to SHA's Bicycle and Pedestrian Coordinator on an on-going basis.

Program Open Space (POS) primary focus is to acquire outdoor recreation and open space areas for public use. POS is administered by Maryland's Department of Natural Resources (DNR) and is funded through the **state real estate transfer tax**. The money set aside for this program is divided equally between local and state projects. Half of the money is used by the state for direct land acquisitions, while the other half is granted to local governments. Using a population-based formula, every July 1, each county in the state and the City of Baltimore is apportioned a specific amount of the money for Program Open Space. In order to receive these funds, counties are required to create Land Preservation and Recreation Plan that outlines acquisition and development goals, of which bicycle and pedestrian facilities may be included. POS provides 100% funding for local land acquisition and will contribute 75% for development costs for county and city parks and recreation areas. As much as 90% of development costs can be funded if Land and Preservation and Recreation Plan goals are met.

Rural Legacy Program was enacted by the 1997 General Assembly as part of Governor Parris N. Glendenning's Smart Growth and Neighborhood Conservation Initiative. The program encourages local governments and private land trusts to identify Rural Legacy areas and to competitively apply for funds to protect the state's most valuable agricultural, forestry, natural, and cultural resources or create new ones.

A combination of Maryland Program Open Space dollars and general obligation bonds from the state's capital budget subsidize the Rural Legacy Program. During the first five years of the Rural Legacy Program between $110 and $128 million will be committed to preserving from 50,000 to 75,000 acres of Maryland's farms, forests, and open spaces. While the focus of this initiative is not specifically for bicycle and pedestrian facilities and programs, they can be proposed as an adjunct or compliment to eligible projects, and may be used to help acquire greenway lands. Applications may be made by local governments or organizations endorsed by local government to the Rural Legacy Board. The Rural Legacy Board, in turn, makes final recommendations to the Governor and the Board of Public Works. The Board of Public Works approves the grants for Rural Legacy funding.

The Sustainable Communities Act of 2010 (HB 475) strengthens reinvestment and revitalization in Maryland's older communities by reinventing an existing rehabilitation tax credit and extending the life of the credit through 2014, simplifying the framework for designated target areas in the Community Legacy (CL) and Neighborhood Business Works (NBW) program by creating "Sustainable Communities", establishing a new transportation focus on older communities, and enhancing the role of the Smart Growth Subcabinet (SGSC) in the revitalization of communities.

The Smart Growth Transit Program (SGTP) is an initiative to encourage community revitalization and to create incentives for development or redevelopment in areas close to MARC, metro, light rail, and bus stations and services. More specifically, these funds are used on behalf of transit-oriented developments that have an appropriate combination of commercial and residential land uses, sufficient density to support public transit usage, and that support community master planning in designated revitalization/growth areas. Improvements to improve bicycling and walking infrastructure are among the projects eligible for SGTP funds. SGTP includes four programs, the Transit Station Development Incentive Program, Neighborhood Conservation, Access 2000 Pedestrian Improvements and the Transit Enhancement Program. Funding is approximately $6 million per year.

Federal

The primary Federal Transportation funding programs for bicycling were consolidated under the MAP-21 legislation of 2012.[1] The Transportation Enhancements, Safe Routes to School and National Recreational Trails programs were combined into the Transportation Alternatives Program). The funding levels were reduced over the previous year's funding levels and some changes were made in project eligibility. Greater approval authority was transferred to Metropolitan Planning Organizations for project selection providing funding opportunities for MPO members that are prepared for grants. Table 1 provides a summary of the types of bikeway projects that would be eligible for the various the Federal Transportation funding programs.

Programs that remain unchanged by MAP-21 are described below:

The Surface Transportation Program (STP) provides flexible funding that may be used by states and localities for projects on any Federal-aid highway project, including bridge projects on any public road, transit capital projects, and intracity and intercity bus terminals and facilities. These funds may be used for either the construction of bicycle transportation facilities and pedestrian walkways, or non-construction projects such as maps, brochures, and public service announcements related to safe bicycle use and walking. Ten percent of each State's annual Surface Transportation Program funds is set aside for the

Hazard Elimination and Railway-Highway Crossing Programs, which addresses bicycle and pedestrian safety at hazardous locations

Congestion Mitigation and Air Quality Improvement Program (CMAQ) funds may be used to construct bicycle facilities, pedestrian walkways, or non-construction projects such as maps, brochures, and public service announcements related to safe bicycle use.

The Recreational Trails Program (RTP) provides funds to States to develop and maintain recreational trails and trail-related facilities for both nonmotorized and motorized recreational trail uses. In addition, it is the only federal transportation funding source that can be used for maintenance activities. The RTP funds are distributed to the States by legislative formula: half of the funds are distributed equally among all States, and half are distributed in proportion to the estimated amount of non-highway recreational fuel use in each State.

Highway Safety Grant Program (Section 402) is administered by the Maryland Highway Safety Office (MHSO), a division of Motor Vehicle Administration. Federal 402 funds are used for pedestrian and bicycle public information and education programs. Funds are distributed to states annually from the National Highway Traffic Safety Administration (NHTSA) according to a formula based on population and road mileage. Maryland receives 402 funds each year. Local jurisdictions submit Expressions of Interest (EOI) to the MHSO in March and commitment letters announcing the approval of the proposed projects are distributed in June. Funds are generally awarded sometime after October 1st each year. Government agencies or government-sponsored entities are eligible to apply for 402 Grant funds. Every county in the state and the City of Baltimore is assigned a Community Traffic Safety Program Coordinator who organizes local Task Forces to identify and prioritize traffic safety issues and develop appropriate countermeasures. Agencies are encouraged to work with their local Task Force to determine the feasibility and eligibility of proposed projects prior to submitting a 402 Grant.

Outside of transportation funding there are a few other federal programs that local communities have used for bicycling improvements and programs, the most common being Community Development Block Grants through the Department of Housing and Urban Development (HUD). Examples of the types of projects include the following:

- Commercial district streetscape improvements
- Sidewalk improvements
- Safe routes to school
- Traffic calming

Table 1: Project Eligibility for Federal Transportation Funding Programs

	Core Federal Aid Programs Oriented to Bicycling					Safety Programs		Transit		Other	
	Transportation Alternatives Program					Non-Infrastructure	Infrastructure				
	Safe Routes to School	TEA	Recreational Trails Program	Congestion Mitigation and Air Quality Improvement	Surface Transportation Program	Highway Safety Funds-402	Highway Safety Improvement Program	FTA	ATI	FHWA-Office of Planning, Environment & Realty	National Highway Performance Program/ NHS
Bicycle Facilities											
Bicycle lanes on roadway	*	*		*	*		*	*	*		*
Paved Shoulders	*	*		*	*		*				*
Safety Signs and Signal improvements	*	*		*	*		*	*			*
Shared use path/	*	*	*	*	*		*	*			*
Trail/highway intersection	*	*	*	*	*		*				*
Trail Bridges		*	*	*	*		*				*
Tunnels and Undercrossings		*		*	*		*				*
Access Enhancements to Public		*		*	*			*	*		
Traffic calming	*	*			*		*	*			*
Recreational trail			*								
Supplemental Infrastructure											
Signed bike route	*	*		*	*			*			*
Sidewalks, new or retrofit	*	*		*	*		*	*	*		*
Crosswalks, new or retrofit	*	*		*	*		*	*	*		*
Curb cuts and ramps	*	*		*	*		*	*			*
Historic Preservation of Transportation		*						*	*		
Landscaping and Streetscaping		*						*	*		
Bus Shelters		*						*	*		
Bicycle parking facilities											
Bicycle parking facilities (racks and	*	*		*	*			*	*		
Bicycle Share (capital costs only,		*		*	*			*	*		*
Bicycle storage/service center	*	*		*	*			*	*		
Safety Education, Encouragement,											
Safety/education staff position	*				*	*					
Police Patrol	*					*					
Helmet Promotion	*	*			*	*					
Maps	*			*	*	*		*	*		
Safety brochure/book	*	*	*	*	*	*					
Training	*	*	*	*	*	*					

Other Funding Sources

Bikes Belong Community Partnership Grant Applications Bikes Belong award to municipalities, counties and grassroots groups for community bicycling projects. Bikes Belong accepts requests for funding of up to $10,000 for facility and advocacy projects and does not consider grant requests for more than 50% or more of the project budget.

Amendment 1 to Council Resolution No. 35-2016

BY: The Chairperson
at the request of the County Executive
and cosponsored by Jennifer Terrasa

Legislative Day No. 4
Date: April 4, 2016

Amendment No. 1

(This amendment substitutes revised maps in order to remove a pathway, along the Little Patuxent River adjacent to the Allview community in Columbia, proposed by Phase II of Capital Project T7107. This amendment also revises the total network miles and bridge count in order to reflect the removal of the pathway and the pathway's related footbridge. The pathway has been removed in response to community opposition and because an alternative pathway is proposed along Broken Land Parkway.)

In the Executive Summary of the Bicycle Master Plan, attached to the Resolution as Exhibit A, on page III, in the table titled "Recommended Network Improvements":

1. In the row titled "New and Upgraded Pathways and Protected Bike Lanes", in the column titled "Total (Miles or Locations)", strike "160 mi." and substitute "159 mi.";
2. In the row titled "Construct New Shared Use Paths & Protected Bike Lanes", in the column titled "Network (Miles)", in the subcolumn titled "Mid Term", strike "21" and substitute "20", and in that same row, in the column titled "Total (Miles or Locations)", strike "122" and substitute "121"; and
3. In the row titled "Bridge and Tunnel Improvements (new and upgrades)", in the column titled "Network (Miles)", in the subcolumn titled "Mid Term", strike "7" and substitute "6", and in that same row, in the column titled "Total (Miles or Locations)", strike "26 Locations" and substitute "25 Locations".

On page 24 of the Bicycle Master Plan, attached to the Resolution as Exhibit A, in Table 2, titled "Summary of Recommendations":

ADOPTED 4/4/16
FAILED
SIGNATURE Jessica Feldmark

1. In the row titled "New and Upgraded Path/Cycletrack or Protected Bike Lanes", in the column titled "Total (Miles or Locations)", strike "160 mi." and substitute "159 mi.";
2. In the row titled "Construct New Shared Use Paths & Protected Bike Lanes", in the column titled "Network (Miles)", in the subcolumn titled "Mid Term", strike "21" and substitute "20", and in that same row, in the column titled "Total (Miles or Locations)", strike "122" and substitute "121"; and
3. In the row titled "Bridge and Tunnel Improvements (new and upgrades)", in the column titled "Network (Miles)", in the subcolumn titled "Mid Term", strike "7" and substitute "6", and in that same row, in the column titled "Total (Miles or Locations)", strike "26 Locations" and substitute "25 Locations".

In the Appendix F of the Bicycle Master Plan, attached to the Resolution as Exhibit A, on page ii, in the table titled "Spot Improvements by Network", strike the entire row that begins with "135".

Remove pages 26, 28, 29 and 30 of the Bicycle Master Plan, attached to the Resolution as Exhibit A, and substitute revised pages 26, 28, 29 and 30, as attached to this Amendment.

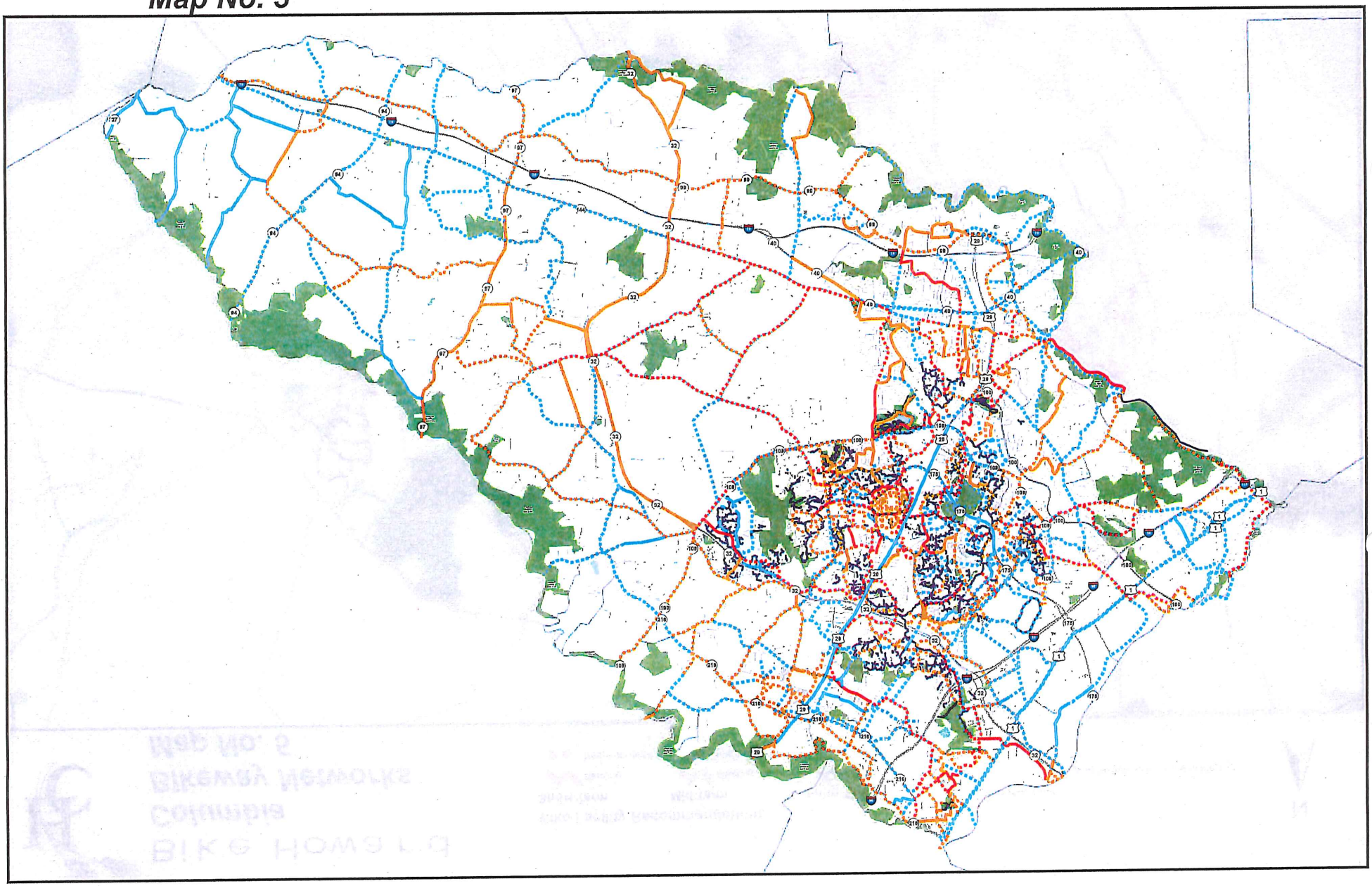
Bike Howard

Rural West/Countywide Bikeway Networks Map No. 3

Bike Facility Recommendations

Short Term	Mid Term	Long Term	
Existing	Existing	Existing	Further Study
Improvements	Improvements	Improvements	Existing Pathways and Trails (HC, CA, and Others)

N

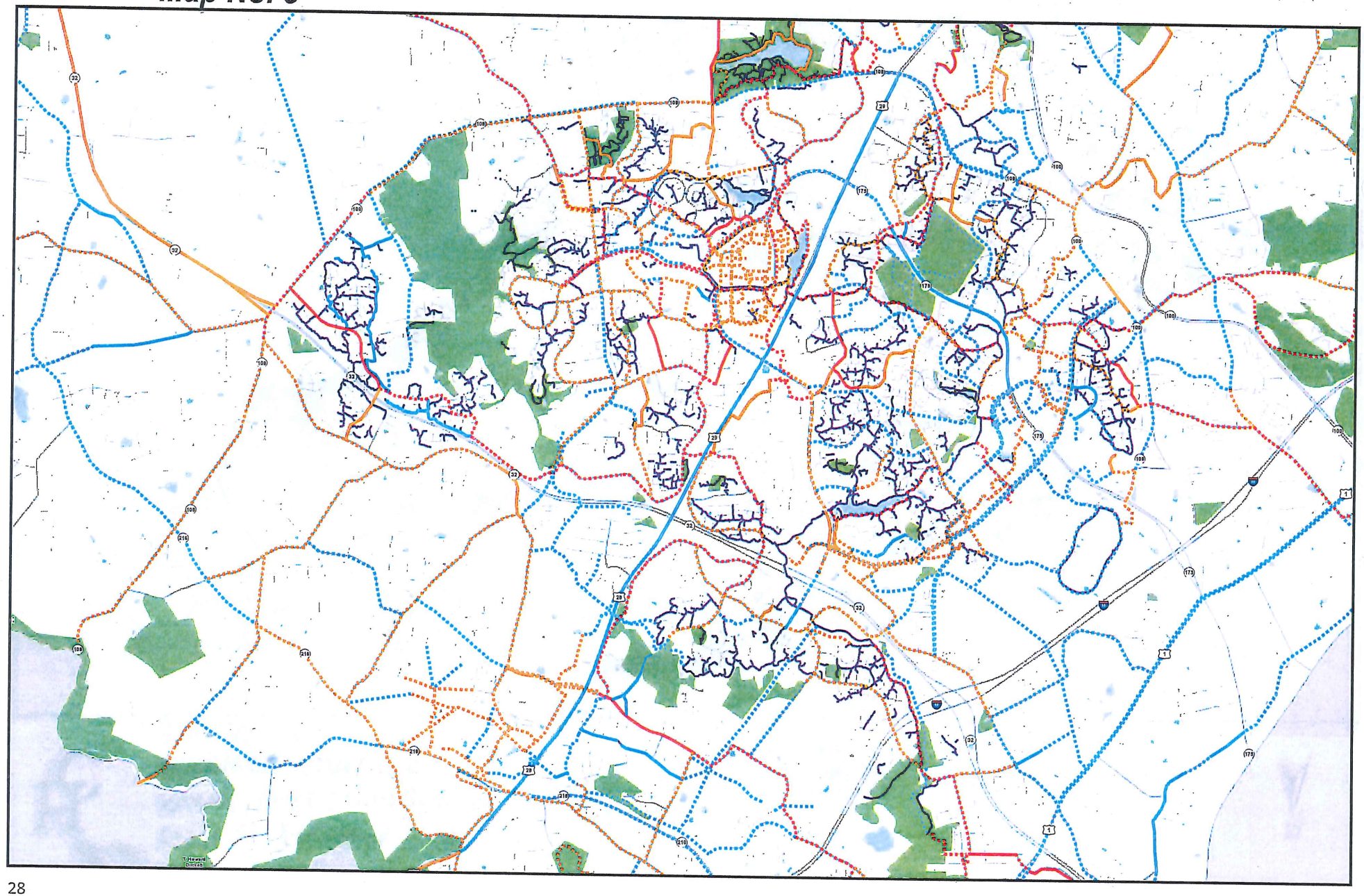


Bike Howard
Columbia Bikeway Networks Map No. 5

Bike Facility Recommendations

Short Term	Mid Term	Long Term	
Existing	Existing	Existing	Further Study
Improvements	Improvements	Improvements	Existing Pathways and Trails (HC, CA, and Others)

N



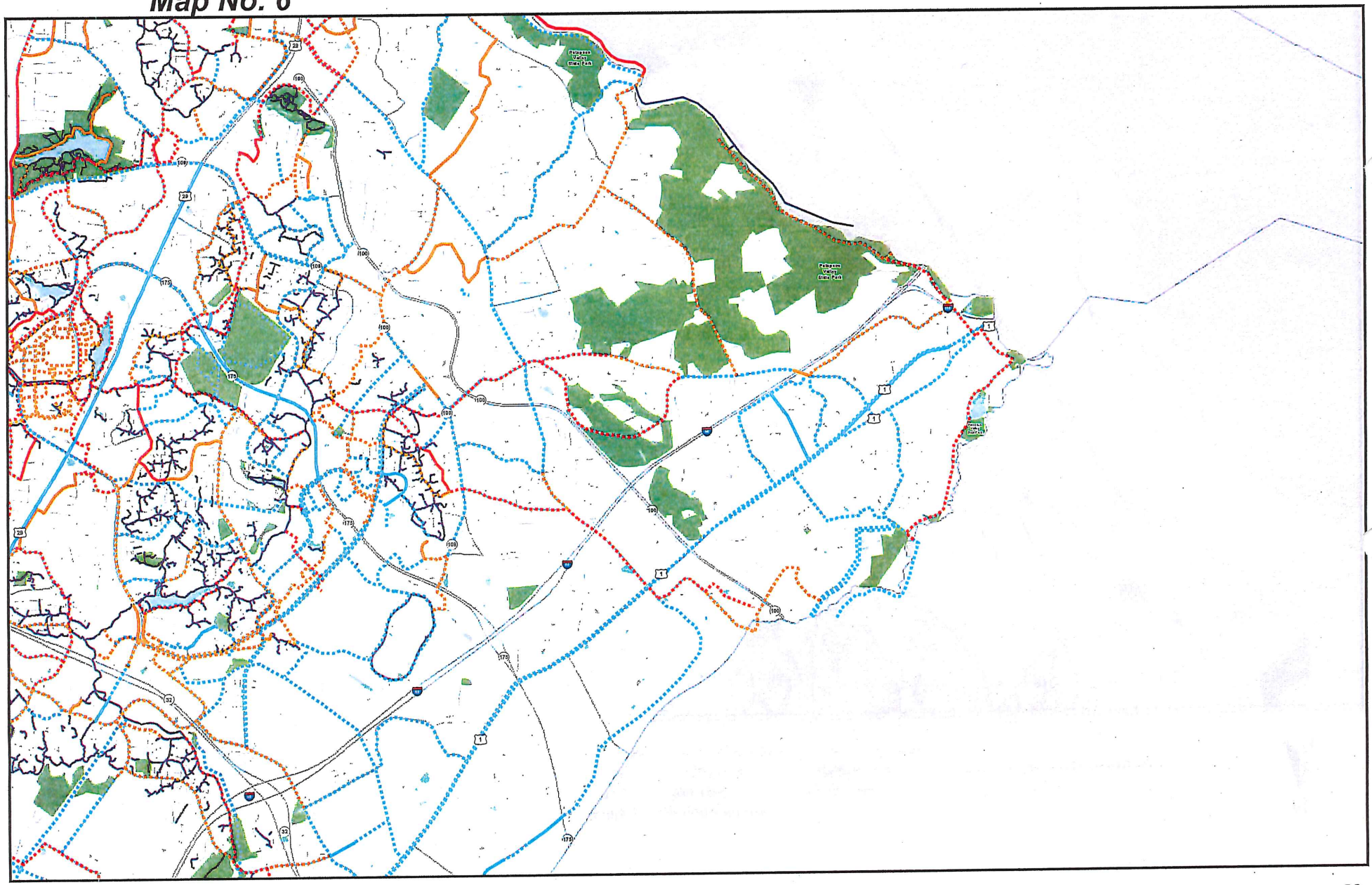
Bike Howard

Elkridge Bikeway Networks Map No. 6

Bike Facility Recommendations

Short Term	Mid Term	Long Term	
Existing	Existing	Existing	Further Study
Improvements	Improvements	Improvements	Existing Pathways and Trails (HC, CA, and Others)

N



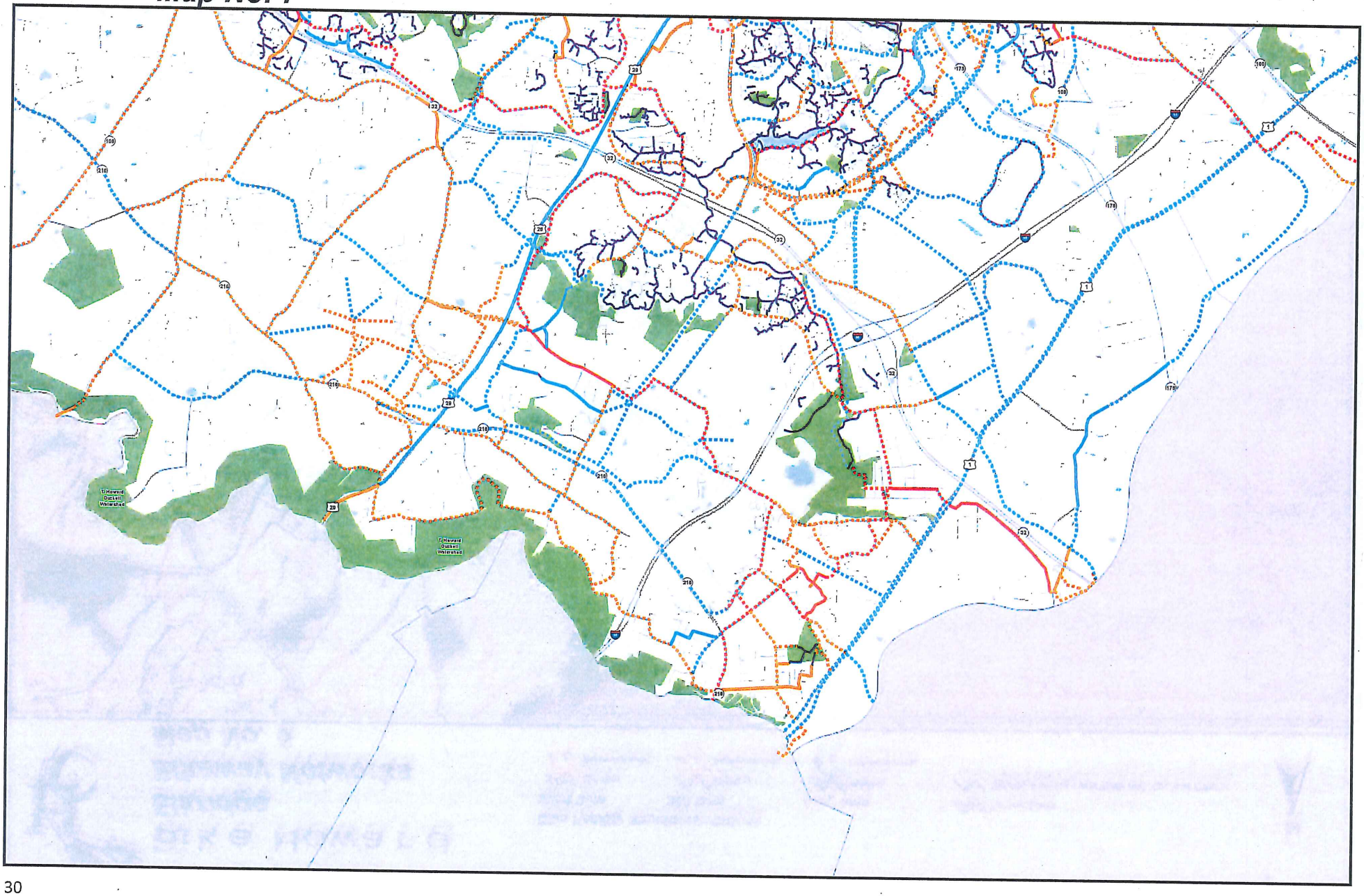
Bike Howard

Southeast Bikeway Networks Map No. 7

Bike Facility Recommendations

Short Term	Mid Term	Long Term	
Existing	Existing	Existing	Further Study
Improvements	Improvements	Improvements	Existing Pathways and Trails (HC, CA, and Others)

N



Amendment 2 to Council Resolution No. 35-2016

BY: Calvin Ball

Legislative Day No. 4

Date: April 4, 2016

Amendment No. 2

(This amendment clarifies that the County Council endorses a complete streets policy and recognizes that the work of the Complete Streets Implementation Team is expected to include drafting of a comprehensive Complete Streets Policy and a Complete Streets Design Manual and requests their submission to the County Council.)

In the purpose paragraph on the title page, after "and", insert "endorsing" and after "policy" insert "as the road use approach" and, after "County", insert "; and requesting the County Executive to take certain actions".

Strike beginning on page 1 in line 27 down through line 3 on page 2 and substitute:

"**WHEREAS**, the County Executive is organizing a working group, the Complete Streets Implementation Team, that is expected to (1) draft a comprehensive Complete Streets Policy consistent with best practices; and (2) develop a Complete Streets Design Manual (the "Design Manual") that implements the Complete Streets Policy and incorporates necessary elements from the current Howard County Design Manual, *Volume III, Roads and Bridges*; and

WHEREAS, upon completion of the Complete Streets Implementation Team's work, the County Executive is expected to submit to the County Council both the comprehensive Complete Streets Policy and Design Manual for final approval; and".

On page 3, insert at line 5:

"**AND BE IT FURTHER RESOLVED** by the County Council of Howard County, Maryland, that the County Council requests that the County Executive direct the Complete Streets

Implementation Team to draft a comprehensive Complete Streets Policy and develop a Complete Streets Design Manual that implements the Complete Streets Policy for submission to the Council for approval."

On page 3, in line 7, strike beginning with "this" down through "approves" and substitute "that it hereby endorses" and in line 8 after "policy" insert "as the road use approach".

In the Bicycle Master Plan of Howard County, attached as Exhibit A, in the following places, after "policy" insert "and a Complete Streets Design Manual":

- on page 11, in the last paragraph on the page, in the second line; and
- on page 111, in the row labelled "Road System Design, in the second column.

ADOPTED 4/4/16
FAILED
SIGNATURE

Amendment 3 to Council Resolution No. 35-2016

BY: Jennifer Terrasa

Legislative Day No. 4

Date: April 4, 2016

Amendment No. 3

(This amendment recommends adding the Office of Transportation to the Subdivision Review Committee.)

In the Bicycle Master Plan of Howard County, attached as Exhibit A, on page 14, in the third line after "intersection.", insert:

*"**Recommendation:** A representative of the Office of Transportation should be added as a member of the Subdivision Review Committee to ensure achievement of the objectives enumerated above and to maintain an ongoing focus on compliance with the Bicycle Master Plan and the Pedestrian Master Plan throughout the subdivision and site development plan review process."*

ADOPTED 4/4/16
FAILED
SIGNATURE Jessica Feldmark

Amendment 4 to Council Resolution No. 35-2016

BY: Jennifer Terrasa

Legislative Day No. 4

Date: April 4, 2016

Amendment No. 4

(This amendment recommends that County governmental projects exemplify best practices in bike- and pedestrian-friendly development.)

In the Bicycle Master Plan of Howard County, attached as Exhibit A, on page 14, in the second column, in the heading that begins with "County Policy Governing" strike "Park" and immediately following "Development" insert "of County Parks and Facilities".

On page 15, in the ninth line, after "nature observation, etc.", insert:

*"**Recommendation:** County Government facilities should be developed in accordance with the Bicycle Master Plan and Pedestrian Master Plan and should model best practices for bicycle and pedestrian connectivity and bicycle parking.*

1. *Ensuring safe and convenient bike and pedestrian access should be considered in siting facilities prior to land acquisition.*
2. *Ensuring safe and convenient bike and pedestrian access should be considered in developing new facilities.*
3. *Promote and implement strategies to enhance safe and convenient bike and pedestrian access to existing government facilities."*

ADOPTED 4/4/16

FAILED

SIGNATURE Jessica Feldmark

Amendment 5 to Council Resolution No. 35-2016

BY: The Chairperson
at the request of the County Executive
and cosponsored by Calvin Ball

Legislative Day No. 4
Date: April 4, 2016

Amendment No. 5

(This amendment adds a note to reference the Downtown Columbia Bridge Feasibility Study, and incorporates changes to Appendix F and Appendix G to incorporate the pedestrian and bicycle bridge crossing US 29.)

On page 24 of the Bicycle Master Plan, attached to the Resolution as Exhibit A, in Table 2, titled "Summary of Recommendations" in the column titled "Bikeway Facility Type", after "Bridge and Tunnel Improvements (new and upgrades)", insert "*".

At the bottom of the page, insert:

"* In addition, the existing bicycle and pedestrian bridge over Route 29 between Downtown Columbia and Oakland Mills was the topic of the 2015 "Downtown Columbia Bridge Feasibility Study". www.howardcountymd.gov/Departments/County-Administration/Transportation/Transportation-Projects. The study evaluated several options to modify the existing bridge or build a new bridge to accommodate transit in addition to improving bicycle and pedestrian traffic. The potential change to this bridge has been incorporated in Appendix F and Appendix G of this plan.".

In Appendix F of the Bicycle Master Plan, on page ii, insert a new row below the row beginning with "117". In the column titled, "Bike Howard ID Number", insert "203". In the column titled, "Recommended Facility Improvements", include "Bridge". In the column titled, "Action", insert "Construct New". In the column titled, "Network", insert "Short Term". In the column titled, "Location", insert "US 29 Pedestrian and Bicycle Bridge".".

On maps 8 and 9, which appear on pages 33 and 34 and in Appendix G, on the pathway shown in alternating green and yellow dashes, label the bridge crossing over the north/south dual highway (US 29) as "1G" and the "Multi Use Path" that runs east from the bridge as "1H".

In Appendix G, in the table captioned "Downtown Columbia Bicycle Facilities and Circulation Plan", after row 1F, insert the following 2 rows:

1G	US 29 crossing	Lakefront	Oakland Mills, Blandair, and points east	New Bridge	New bridge will connect Downtown Columbia with Oakland Mills and other areas east of Route 29.
1H	Multi Use Pathway	US 29 bridge	Blandair	Shared Use Path	A shared use path will allow access to Oakland Mills and Blandair.

ADOPTED as amended 4/4/16
FAILED
SIGNATURE Jessica Feldmark

Amendment 1 to Amendment 5 to Council Resolution No. 35-2016

BY: Jennifer Terrasa and Calvin Ball

Legislative Day No. 4

Date: April 4, 2016

Amendment No. 1 to Amendment #5

(This amendment incorporates the pedestrian and bicycle bridge crossing over US 29.)

In the parenthetical description of the purpose of the amendment, after "Study" insert "*, and incorporates changes to Appendix F and Appendix G to incorporate the pedestrian and bicycle bridge crossing US 29*".

On page 1, at the end of line 11, after "traffic." Insert:

"The potential change to this bridge has been incorporated in Appendix F and Appendix G of this plan.

In Appendix F of the Bicycle Master Plan, on page ii, insert a new row below the row beginning with "117". In the column titled, "Bike Howard ID Number", insert "203". In the column titled, "Recommended Facility Improvements", include "Bridge". In the column titled, "Action", insert "Construct New". In the column titled, "Network", insert "Short Term". In the column titled, "Location", insert "US 29 Pedestrian and Bicycle Bridge".".

On maps 8 and 9, which appear on pages 33 and 34 and in Appendix G, on the pathway shown in alternating green and yellow dashes, label the bridge crossing over the north/south dual highway (US 29) as "1G" and the "Multi Use Path" that runs east from the bridge as "1H".

In Appendix G, in the table captioned "Downtown Columbia Bicycle Facilities and Circulation Plan", after row 1F, insert the following 2 rows:

1G	US 29 crossing	Lakefront	Oakland Mills, Blandair, and points east	New Bridge	New bridge will connect Downtown Columbia with Oakland Mills and other areas east of Route 29.
1H	Multi Use Pathway	US 29 bridge	Blandair	Shared Use Path	A shared use path will allow access to Oakland Mills and Blandair.

".

ADOPTED 4/4/16
FAILED
SIGNATURE Jessica Feldmark

Amendment 6 to Council Resolution No. 35-2016

BY: The Chairperson
at the request of the County Executive

Legislative Day No. 4
Date: April 4, 2016

Amendment No. 6

(This amendment adds a tracking and reporting recommendation, and clarifies the process for amending the Bicycle Master Plan, as well as proposes a potential public input process.)

On page 52 of the Bicycle Master Plan, attached to the Resolution as Exhibit A, before the sub-section titled, "Building Institutional Capacity", insert:

"*Network Improvement Implementation Process*

The structured projects in BikeHoward depict implementation projects at "planning level" detail that gives sufficient information to convey the route and type of project that is contemplated, but still allows for modifications, based on additional study, design and engineering and public input. Modifications that are generally consistent with the project as described in the Plan would not require a Plan amendment. Modifications that the Office of Transportation deems significant would require a County Council-approved Plan amendment, or approval through another public process such as the Capital Budget process that includes County Council approval.

At the request of the Planning Board, Section 10 of the Plan (Implementation Matrix) was amended to state that a public process for implementation of structured projects will be developed within two years. The following table recommends a framework for this public process:

Resurfacing project	Striping roadway with bicycle lanes, shared lane markings (sharrow)	Public meeting by OoT if on-street parking would be removed, or if vehicular travel lane patterns would change significantly.
Development Process (e.g., rezoning, subdivision, special exception, site development plan)	Portion of BikeHoward structured project (bicycle lane, portion of off-road path, spot road widening) connection between neighborhoods.	Bicycle improvement discussed/addressed as part of Department of Planning and Zoning notice, review, and approval process. The OoT shall be included in the process.
Capital Project		
Minor (for example, a curb ramp project, crosswalk, or traffic signal modifications).	Traffic signal detection for cyclists, shared lane markings, wider than standard curb ramp	Public meeting by OoT if on-street parking would be removed, or if vehicular travel lane patterns would change significantly.
Major	Standalone BikeHoward structured project or structured project being implemented in association with, for example, a major road improvement, water and sewer project, park or public school.	1. Project will be reviewed with the Bicycle Advisory Group, as well as discussed at the annual BikeHoward Open House. 2. The BPAB shall review Project using a public process. 3. The OoT shall be included in process. ~~2~~ 4. Project will be listed in the Capital Budget and follow the Capital Budget Public Input Process. ~~3~~ 5. Project will have a page on bikehoward.com with all associated project documents, and a summary of public comments with responses. 6. The County web site shall include a prominent link to bikehoward.com. ~~4~~ 7. Public meetings at 30% and 90% design stages before construction.

"

On page 53 of the Bicycle Master Plan, attached to the Resolution as Exhibit A, after the second recommendation of the sub-section titled, "Interagency and Inter-Jurisdictional Coordination", insert a new sub-section titled, "Tracking and Reporting". Under the new sub-section heading, "Tracking and Reporting", insert:

"In order to encourage involvement by the entire community and continue to be transparent and open in implementing the recommendations of this Plan, a process should be outlined to track the progress of implementation, as well as continue to solicit public input.

***Recommendation**: The Office of Transportation should host an annual, public BikeHoward Open House each winter. At these events, the Office of Transportation should provide updates on*

the progress of BikeHoward implementation and should solicit feedback on past implementation as well as solicit input regarding future projects and grant applications.

***Recommendation**: The Office of Transportation should produce and disseminate an annual BikeHoward Implementation Progress report to the County Executive and the County Council, as well as post it publicly on the BikeHoward website.*

***Recommendation**: The Office of Transportation should comprehensively review the Bicycle Master Plan every five years and recommend changes for approval by the County Council.".*

ADOPTED as amended 4/4/16
FAILED
SIGNATURE Jessica Feldmark

Amendment 1 to Amendment 6 to Council Resolution No. 35-2016

BY: Jennifer Terrasa **Legislative Day No. 4**

Date: April 4, 2016

Amendment No. 1 to Amendment 6

(This amendment requires that the Office of Transportation and the Bicycle Pedestrian Advisory Board have specified roles and that the County web site shall include a certain link.)

In the table at the top of page 2:

- in the row labelled "Development Process", in the third column, add the following sentence: "The OoT shall be included in the process.".
- in the row labelled "Major", in the third column, add the following items and renumber accordingly:

"2. The BPAB shall review Project using a public process.

3. The OoT shall be included in process

6. The County web site shall include a prominent link to bikehoward.com.".

ADOPTED 4/4/16
FAILED
SIGNATURE

Amendment 7 to Council Resolution No. 35-2016

BY: Jennifer Terrasa

Legislative Day No. 4

Date: April 4, 2016

Amendment No. 7

(This amendment recommends creating Bicycle and Pedestrian Advisory Board.)

In the Bicycle Master Plan of Howard County, attached as Exhibit A, on page 53, in the second column after "entities.", insert:

*"**Recommendation:** A permanent Bicycle and Pedestrian Advisory Board (BPAB) should be established to provide technical assistance and the perspective of pedestrians and bicyclists."*

Also on page 53, in the second column, before "DPW" insert "BPAB, "

ADOPTED 4/4/16

FAILED

SIGNATURE Jessica Feldmark

Amendment 8 to Council Resolution No. 35-2016

BY: Jennifer Terrasa

Legislative Day No. 4

Date: April 4, 2016

Amendment No. 8

(This amendment removes references to certain streets south of Gorman Road.)

In the Bicycle Master Plan of Howard County, attached as Exhibit A:

- on page 55, in row 6, delete "Ridings Way at proposed junction with Project No. 5 to Knights Bridge Road (Sharrows), Knights Bridge Road (Bike Lane),"; and
- on page 65, in Structured Project Number: 6, delete all bike facility markers south of Gorman Road.

ADOPTED 4/4/16
FAILED
SIGNATURE

County Council of Howard County, Maryland

2016 Legislative Session

Legislative Day No. 3

Resolution No. 35 -2016

Introduced by: Chairperson at the request of the County Executive

A RESOLUTION approving a Bicycle Master Plan and a Complete Streets policy for Howard County.

Introduced and read first time _____, 2016.

By order _____
Jessica Feldmark, Administrator

Read for a second time at a public hearing on _____, 2016.

By order _____
Jessica Feldmark, Administrator

This Resolution was read the third time and was Adopted___, Adopted with amendments___, Failed___, Withdrawn___, by the County Council on _____, 2016.

Certified By _____
Jessica Feldmark, Administrator

NOTE: [[text in brackets]] indicates deletions from existing law; TEXT IN SMALL CAPITALS indicates additions to existing law; ~~Strike-out~~ indicates material deleted by amendment; Underlining indicates material added by amendment

WHEREAS, the Bicycle Master Plan, attached as Exhibit A, creates the vision and path forward for Howard County to become a bicycle friendly community by making it easy for people of all ages and abilities to get around by bicycle; and

WHEREAS, the Bicycle Master Plan was developed with extensive public input and with oversight from the Office of Transportation, a multi-disciplinary Technical Advisory group, and a consultant with extensive experience in drafting similar plans around the country; and

WHEREAS, the Bicycle Master Plan provides guidance and recommendations in the categories of policy updates, programs for education, encouragement, and enforcement, as well as suggested infrastructure improvements to create a connected bike network; and

WHEREAS, the Bicycle Master Plan is identified in PlanHoward 2030, the County's General Plan, as Policy and Implementing Action 7.6a to be completed; and

WHEREAS, the County Executive believes that streets should be safe and accommodating for everyone, whether they are driving, walking, biking, or taking public transit; and

WHEREAS, the County Executive has proposed a Complete Streets policy statement within his letter of support that will be included in the Bicycle Master Plan that states, *"To ensure that Howard County is a place for individuals of all backgrounds to live and travel freely, safely, and comfortably, public and private roadways in Howard County shall be safe and convenient for residents of all ages and abilities who travel by foot, bicycle, public transportation or automobile, ensuring sustainable communities Countywide."*; and

WHEREAS, the County Executive is organizing a working group, the Complete Streets Implementation Team, that will first evaluate the Howard County Design Manual, *Volume III, Roads and Bridges*, (the "Design Manual") in order to recommend changes to incorporate the Complete Streets policy; and

WHEREAS, upon completion of the Complete Streets Implementation Team's review, the County Executive will submit to the County Council recommended changes to the Design Manual consistent with the Complete Streets policy; and

WHEREAS, the League of American Bicyclists is a 501(c)(3) organization that works to create a Bicycle Friendly America through education programs, creating better biking environments, and promoting bicycling as a transportation option of choice; and

WHEREAS, a bicycle-friendly community designation from the League of American Bicyclists is a highly coveted award that identifies the community as one that is improving public health, reducing traffic congestion, improving air quality, and improving the quality of life; and

WHEREAS, a bicycle-friendly community designation marks the community as a vibrant destination for residents and visitors, which holds positive economic benefits for the entire community; and

WHEREAS, the approval of this Resolution will greatly aid the County in its pursuit of receiving a bicycle-friendly community designation from the League of American Bicyclists, and to be the first county to do so in the State of Maryland; and

WHEREAS, the Bicycle Master Plan was reviewed and recommended approval unanimously by the Planning Board on January 7, 2016, with the note that the projects are preliminary and to include the development of a public input process as a step in the implementation matrix.

NOW, THEREFORE, BE IT RESOLVED by the County Council of Howard County, Maryland, this _____ day of _____, 2016, that it hereby approves the Bicycle Master Plan of Howard County, attached as Exhibit A.

AND BE IT FURTHER RESOLVED by the County Council of Howard County, Maryland, that the Council is approving the Bicycle Master Plan with the understanding that specific routes identified in the Plan are suggested at a very high planning level, and may be altered following additional detailed design planning and public comment.

AND BE IT FURTHER RESOLVED by the County Council of Howard County, Maryland, this _____ day of _____, 2016, that it hereby approves a Complete Streets policy for Howard County.

Policy Recommendations for Bicycle Infrastructure Planning, Implementation and Management

To ensure the most efficient development of a bicycle-friendly Howard County, policies affecting bicycling in the Zoning Ordinance, the Subdivision and Land Development Regulations, and the Howard County Design Manual should be reviewed and modified as necessary. This section of BikeHoward identifies key issues addressed by these documents and recommends the policy outcomes that should be achieved in initiatives to update and revise them.

Additionally, there may be other policies, practices and design guidelines that need to be revised to achieve the objectives in this section of the plan. The following recommendations are organized by general topic and may need to be addressed by more than one agency or within more than one policy document.

Transportation Planning

Changes to transportation planning practices are recommended in the areas of staffing, transit planning and traffic projections.

Staffing

Recommendation: *Develop a Bicycle and Pedestrian Coordinator Position.*

To address the increased level of work necessary to implement BikeHoward and the specialized skills needed to effectively address bicycling issues, at least one person should be hired to provide focused leadership in this area.

Public Transit Planning Activities

Recommendation: *Ensure that the practice of scoping transportation studies always includes elements related to bicycling and other relevant intermodal and multi-modal topics.*

Future planning and feasibility studies related to existing or new public transit services or systems should address bicycling in a variety of ways, i.e. bikes on transit vehicles, bike parking at transit stations and stops, bicycle access to transit stations and stops.

Future Traffic Projections

Recommendation: *In coordination with the Baltimore Regional Transportation Board develop long-range transportation forecasting methods and models for bicycle and pedestrian trips.*

Current traffic models do not typically account for bicycle trips, and existing bicycling levels are admittedly low.

Recommendation: *Consider the establishment of a bicycle counting program that would allow the County to measure annual changes in bicycle ridership and traffic counts to better understand the impacts of enhanced bicycle facilities.*

At least 10 locations, including both road and trail settings, can be identified for use of automated bicycle counting technology. Counts can be performed on a continuous basis. The County can model its program after a similar program evolving in Arlington , VA and promote the activity with the Baltimore Metropolitan Council and its member jurisdictions. Baltimore City has recently initiated a manual counting program using trained local cyclists and transportation professionals.

Road System Design

Roadway and bikeway design policy and guidelines should be thoroughly reviewed and updated. In general, bikeway design practices should conform to the current edition of the American Association of State Highway and Transportation Officials (AASHTO) Guide to the Development of Bicycle Facilities. In addition to this, County guidelines should be informed by SHA's currently adopted Bicycle Policy & Design Guidelines, the Urban Bikeway Design Guidelines from National Association of City Transportation Officials (NACTO) and the Maryland and Federal Manuals on Uniform Traffic Control Devices (MUTCD). County standards should be based upon the most current national and state standards and guidelines.

While these guidance documents are useful resources, the County also needs specific guidelines tailored directly to developing the bicycle network; and its relationship to other users and environmental considerations.

The following recommendations will enable DPW and the Maryland State Highway Administration (SHA) and other relevant entities to design and build many of the bicycle facilities and treatments that make up the bikeway network to be described in the following chapters of BikeHoward.

Complete Streets

Recommendation: *Develop a "complete streets" policy to ensure that Howard County streets are designed, built, and operated to enable safe access for all users, including pedestrians, bicyclists, motorists and transit riders of diverse ages and abilities. This could include requiring the development of site and location specific bicycle and pedestrian circulation plans.*

General Roadway and Bikeway Facility Design Guidelines

Recommendation: *Consider the adoption of the specific roadway and bikeway design guidelines related to the facilities proposed in this Plan as outlined in Appendix A.*

Appendix A provides specific guidance regarding lane diets and minimum travel lane widths, shoulder widths, bicycle lane widths, shared use path widths, shared use sidewalk widths and other features and is intended to serve as guidelines for the county and inform the county's actions with SHA in relation to state roads in Howard County.

By-pass lanes

Recommendation: *Monitor DPW and SHA roadway resurfacing and design projects.*

In rural areas, where by-pass lanes are provided on two lane roads, if the roadway section approaching the by-pass lane has a shoulder it is essential that the shoulders are continued through the widened roadway section.

Slip Lane Design and Warrants

Recommendation: *Consider revising traffic volume warrants for slip lanes, including the review of design standards to include: a) pocket bike lanes and dashed bike lanes showing the cyclist's left merging movement, b) the radii of slip lanes should be designed to reduce entry and exit speeds, and c) high quality bicycle and pedestrian crossing accommodations should be provided for those traveling on the crossing roadway.*

Right turn slip lanes at intersections can create a dangerous situation for cyclists.

Bicycle Design for Roundabouts

Recommendation: *Consider retrofitting existing roundabouts and traffic circles with appropriate signs and striping to provide bicycle accommodations and appropriate directives and warnings for bicyclists and motorists. Update design guidance that will be used to design future roundabouts.*

Most roundabouts in the county are appropriately small and one lane. Bicyclists should be encouraged to take the lane upon approach to roundabouts and they should be provided sufficient advance directive to do so. Motorists should be alerted to expect this movement from cyclists and be directed to yield respectfully. This can be done by providing signage for motorists and cyclists as per the MUTCD.

Bicycle Friendly Traffic Calming

Recommendation: *Consider designing all traffic calming treatments, such as speed humps, curb extensions, chicanes, etc. to allow easy passage for cyclists. When travel lanes are narrowed at intersections or mid-block crossings to reduce crossing distances for pedestrians, slots should be provided so that bicyclists traveling on the right do not have to merge into the travel lane to pass through the narrowed section of roadway.*

Bicycle-friendly traffic calming designs can be found in a number of traffic calming design resources, including The AASHTO *Guide for the Development of Bicycle Facilities*; *Traffic Calming: State of the Practice*, ITE/FHWA, 1999; and the Institute of Transportation Engineers' (ITE) website and fact sheets (http://www.ite.org/traffic/tcdevices.as).

Compliance with State Stormwater Regulations

Increasingly, compliance with state stormwater management regulations are affecting shared use path projects and on road bicycle facilities. Shared use path projects are being scrutinized closely because they add impervious surface and are reviewed in the same manner as parking lots and roads. This can cause paths to be reduced in width, reducing their effectiveness. In addition, these regulations can also lead to road improvement projects that minimize shoulder width or eliminate paved shoulders in efforts to meet stormwater regulations.

Recommendation: *Given their low impact on stormwater runoff and water quality, the county should consider advocating for and work with state officials to identify and encourage alternate best practices for stormwater management appropriate for non-motorized pathways.*

Recommendation: *Trail projects should consider utilizing Low Impact Development (LID) and other design treatments as a part of trail and path projects to ensure that trail designs do not promote erosion and appropriately direct runoff to pervious areas that can filter and absorb water.*

Low Impact Development is a design and engineering approach to manage storm water runoff which uses conservation and on-site natural features close to a project to mitigate the impact of stormwater.

Recommendation: *Roadway improvement projects should consider utilizing pavement reduction strategies, where appropriate that support bicycling, such as:*

- *Reducing the width of wide motor vehicle lanes (greater than 12 feet)*
- *Reducing curb radii at intersections*
- *Reducing the use of slip lanes for right turn movements*
- *Minimizing the foot print of intersections, and including LID treatments in place of asphalt where it is not needed for vehicular movements*
- *Minimizing the length of turn lanes and stacking lanes*
- *Minimizing the use of acceleration lanes*
- *Using planted buffer spaces to separate bicycle traffic from high speed motor vehicle traffic*

Howard County Scenic Roads

The County has a policy designed to help preserve the integrity of view sheds and environmental features of certain roads.

Recommendation: *Consider amending Howard County Scenic Roads legislation to accomplish the following: a) clarify that road improvements allowed on designated scenic roads to provide safe conditions for traffic includes improvements for the safety of bicycle traffic, b) that improvements listed in BikeHoward as components of the "facility type" Shared Roadway with Safety Treatments are in keeping with the county's definition of allowable roadway improvements for designated scenic roads, c) that designation of scenic roads as recreational bikeways, and signing them as such, complements the County's scenic roads policy and program goals, and that d) increased levels of bicycling on scenic roads strengthens the County's efforts to sustain the scenic and historic quality of these roads while at the same time increase the public's opportunity to enjoy them on a regular basis.*

County policy governing improvements to designated scenic roads states, "Improvement to scenic roads must protect the features that contribute to the road's scenic character, such as width, alignment, and vegetation or slopes within the right-of-way… road design standards require that improvements within the right-of-way of scenic roads be designed to preserve the character of the road while providing safe conditions for traffic." Current recommendations to update scenic roads policy suggest that improvements should be restricted to carefully designed spot improvements which retain the scenic qualities of the road. Many of the bicycle safety treatments referred to in BikeHoward for potential application on roads mapped as Shared Roadways with Safety Treatments, are in keeping with this policy recommendation.

Land Development Policies that Govern Private Development and Site Plan Review

Recommendation: *County zoning, subdivision policy, and the County Design Manual, all of which regulate new development, redevelopment and site design should be, where feasible, updated to achieve the following objectives related to implementing BikeHoward and improving conditions for bicycling:*

1. *Ensuring that all new development or redevelopment plans do not reduce or degrade the amount of space available for bicycling on public roads along the property frontage or on access roads. This shall apply to existing travel lanes of 11 feet or greater, paved shoulders, parking lanes and other road elements not marked or shown as a legal bike facility.*
2. *Ensuring that appropriate types and quantities of bicycle parking are provided in commercial, retail, institutional, multi-family residential and public facility developments.*
3. *Ensuring that bicycle and pedestrian connectivity from residential developments is provided to surrounding developments as well as to roadway, utility, school and park rights-of way adjacent to the property.*
4. *Ensuring that commercial development provides bicycle and pedestrian connectivity to adjoining properties.*
5. *Ensuring that large tract multi-family residential developments provide public access ways through the development that are designed for bicyclists and pedestrians.*
6. *Increasing the traffic generation thresholds that trigger provision of right and left turn lanes into the development from arterial and collector roads. Emphasis should be placed on reducing delays from left turns. A higher threshold of traffic generation should be provided before right turn receiving lanes are required.*
7. *Determine the provisions that could require offsite road improvements related to traffic impacts include provision of shoulders or bike lanes for up to 0.1-0.2 of a mile in each direction from the development property boundary on entrance frontage.*
8. *Intersection improvements required of developers as a result of traffic impacts should include upgraded bicycle and pedestrian*

accommodations at and approaching the intersection.

Howard County Public School Policy Governing Site and Road Design for Public Schools

Recommendation: *The following recommendations are provided for guidance and direction on how public school property can contribute to a bicycle-friendly Howard County. The Howard County Public Schools and School Board should consider adopting the following policies:*

1. *Replace existing substandard bicycle parking equipment with racks that meet standards described in this plan and begin a process of providing covered bicycle parking where bicycle access is highest.*

2. *Manage bicycle parking supply in response to use and need, to ensure that all schools have sufficient supply to meet the needs of students, teachers, staff, visitors and school and non-school events that use school facilities.*

3. *At middle and high schools especially, provide appropriate bicycle facilities on and/or adjacent to school entry roads, drive ways, parking lots and circulation roadways.*

4. *Provide pathways through school grounds and around athletic fields as identified in* BikeHoward, *and as may be identified in future updates of* BikeHoward *to ensure that school properties can contribute to a continuous and connected bikeway network. Funding may be provided through HCPSS capital improvement funds, county transportation funds, and other funding sources, including state and federal grants.*

5. *Provide direct bicycle and pedestrian access paths to existing and new schools from adjacent neighborhoods. Where ever possible these paths shall be provided by residential property developers.*

6. *Consider siting new schools in locations that will: a) maximize access by walking, bicycling and use of public transit; b) ensure that school site design minimizes conflicts between motorized and non-motorized access modes and c) favors student and other arrivals by walking, bicycling, public transit and school bus, not motor vehicle drop-off.*

County Policy Governing Park Design and Development

Recommendations: *The following recommendations are provided for guidance and direction on how parks can contribute fully to a bicycle-friendly Howard County. The Howard County Department of Recreation and Parks (DRP) should consider adopting the following policies:*

1. *Replace existing substandard bicycle parking equipment with racks that meet standards described in this plan and begin a process of providing covered bicycle parking where bicycle access is highest.*

2. *Manage bicycle parking supply in response to use and need, to ensure that all parks have sufficient supply to meet the needs of park visitors.*

3. *Provide temporary bicycle parking for special events as it may be requested by event sponsors.*

4. *Promote bicycle access to parks as an alternative to motor vehicle access and as a way to: a) reduce the need for asphalt surface parking lots, b) reduce car trips and resulting air pollution, and c) promote healthy and active living.*

5. *Provide appropriate bicycle facilities on and/or adjacent to park entry road drive ways, parking lots and park circulation roadways.*

6. *Develop pathways through park lands as identified in the BikeHoward, and as may be identified in future updates of the Plan. Funding may be provided through DRP capital improvement funds, County transportation funds, or other sources.*

7. *Design and build Transportation Trails (as so designated in this Plan) to width and surface standards detailed in Appendix A.*

8. *Update the Blandair Park Development Plan based upon consideration of proposed adjustments to a small number of proposed trail alignments. These alignments will improve directness and user experience in the bikeway network and better enable park trails to contribute to a continuous and connected county-wide system of bikeways.*

9. *Implement the on-road, off-road and spot recommendations in this plan that are on or directly related to Howard County park lands. These may be in Centennial Lake Park, Meadowbrook Park, Rockburn Branch Park, Cedar Lane Park, and on the Patuxent Branch Trail.*

10. *Provide direct bicycle and pedestrian access paths to existing and new parks from adjacent neighborhoods.*

11. *In regional parks with large pathway systems, DRP should consider creation of a hierarchy of paved paths, providing sufficient width for high volumes of mixed use, and through bicycle movements on select paths, and providing narrower, varied-surface paths for pedestrian strolling, hiking, nature observation, etc.*

Bikeway Management & Maintenance

Due to the extensive pathway system managed by Columbia Association and the Department of Recreation and Parks, the County is well acquainted with the maintenance and management of shared use paths. None the less, these practices will need to be upgraded to appropriately manage shared use paths for transportation use. Moreover, as the inventory of on-road bicycle facilities increases, management and maintenance of this system will require greater attention. The following list of maintenance and management practices for path and on-road bikeways are recommended.

On-Road Bikeway Maintenance and Management

Recommendations:

1. *Use the County's mobile app. (Tell HoCo) and/or online reporting systems system to identify road hazards that pose a safety risk for cyclists.*

   Encourage bicycle clubs and advocacy groups to use this service. As hazards are addressed, the County should provide feedback to the citizens that report problems as well as to the community at large, to describe what citizens and government can do together in an ongoing partnership.

2. *Develop a bike lane and shoulder sweeping program that focuses on the roads with the worst debris build up and those with the highest user levels.*

3. *Restripe bicycle lanes and reapply shared lanes markings as needed.*

4. *Develop an asset management database for maintenance of wayfinding and other signs used in the bikeway system.*

5. *Develop a coordination protocol between County roadway maintenance officials and State Highway Administration roadway maintenance offices.*

Trail Maintenance and Management

Recommendations:

1. *Expand the geo-coded emergency response location system to include CA and other pathway tunnels and other regularly spaced markers to ensure that the trail systems are fully covered.*

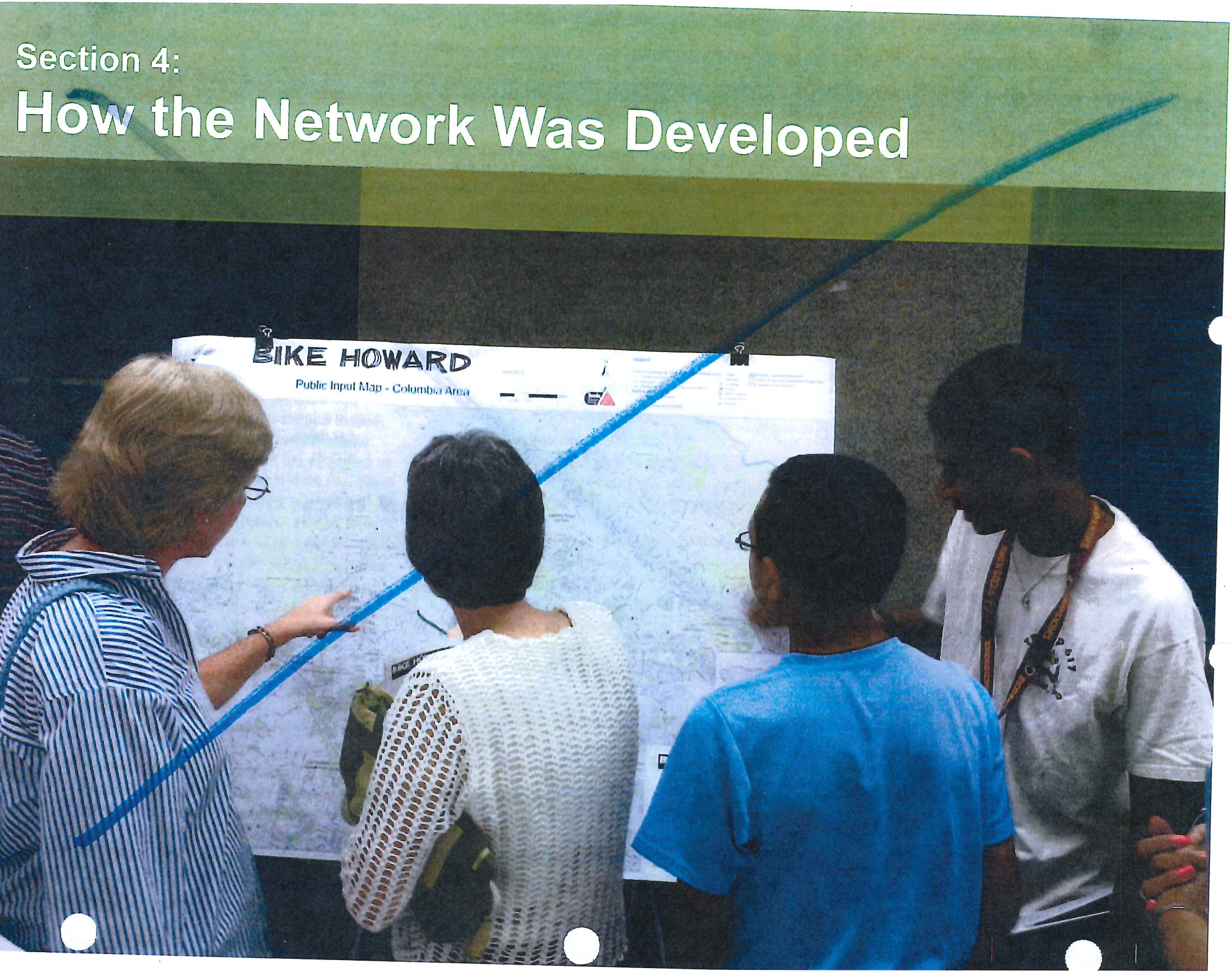
2. *Develop a program that involves volunteers in trail maintenance, especially youth on County paths and trails.*

Volunteer cyclists may also be useful to conduct periodic visual inspection of bicycle related signs and markings.

The following Chapter discusses how the network was developed.

Section 4:

How the Network Was Developed



The Countywide Bikeway Network

This chapter describes the Long-Term, Mid-Term and Short-Term networks and the recommendations that comprise the Countywide Bikeway Network and describes the bikeway facility types that make up the networks.

Short-Term Network

The Short-Term Network utilizes the core of the existing pathway system and provides a basic level of connectivity in the more heavily populated and developed core of the county. The Short-Term Network is projected to take 10 years to fully develop from the adoption of BikeHoward. Outside of the existing pathway system, it also leverages committed projects being planned and built by as part of the redevelopment of Downtown Columbia and by Columbia Association.

This network mostly includes variable stress facility improvements on low and medium volume roads. It includes 72 miles of on-road bikeway improvements, 23 miles of new and upgraded pathways and 47 spot improvements at intersections and pathway crossings.

A few north-south routes are included, linking Historic Ellicott City and the Howard County government center to downtown Columbia, Oakland Mills, Savage and Laurel. East-West routes link the Howard County General Hospital (HCGH) to Rockburn Regional Park, and River Hill to the Savage MARC station.

Mid-Term Network

The Mid-Term Network is oriented to ensure that most of the Key Destinations identified by the long term vision for the county are connected. It includes 160 miles of upgrades and improvements on roads, 34 miles of new and upgraded paths and recommends 97 spot improvements at intersections, trail crossings, bridges and tunnels.

In addition to recommendations for trail and pathway upgrades, the Mid-Term Network includes much of the existing CA trail system. A major goal of this network is to create a bikeway system that will attract more people from the *interested but concerned* group of cyclists. It relies more heavily on development of low and medium stress bikeways in high stress corridors. Build out of this network is projected to take 20 years from plan adoption. It aims to create both transportation routes and recreational routes, linking more of the scenic and historic corridors in both the western and eastern portions of the county.

Long-Term Network

The Long-Term network is the long term vision for the whole county and is comprised of the recommendations that are not included in the Mid-Term and Short-Term Networks.

Many of the facility improvements designated in this network will likely happen in conjunction with major roadway reconstructions and expansions and is projected to take place 20 to 30 years following the adoption of BikeHoward. Other types of projects in the countywide network include the following:

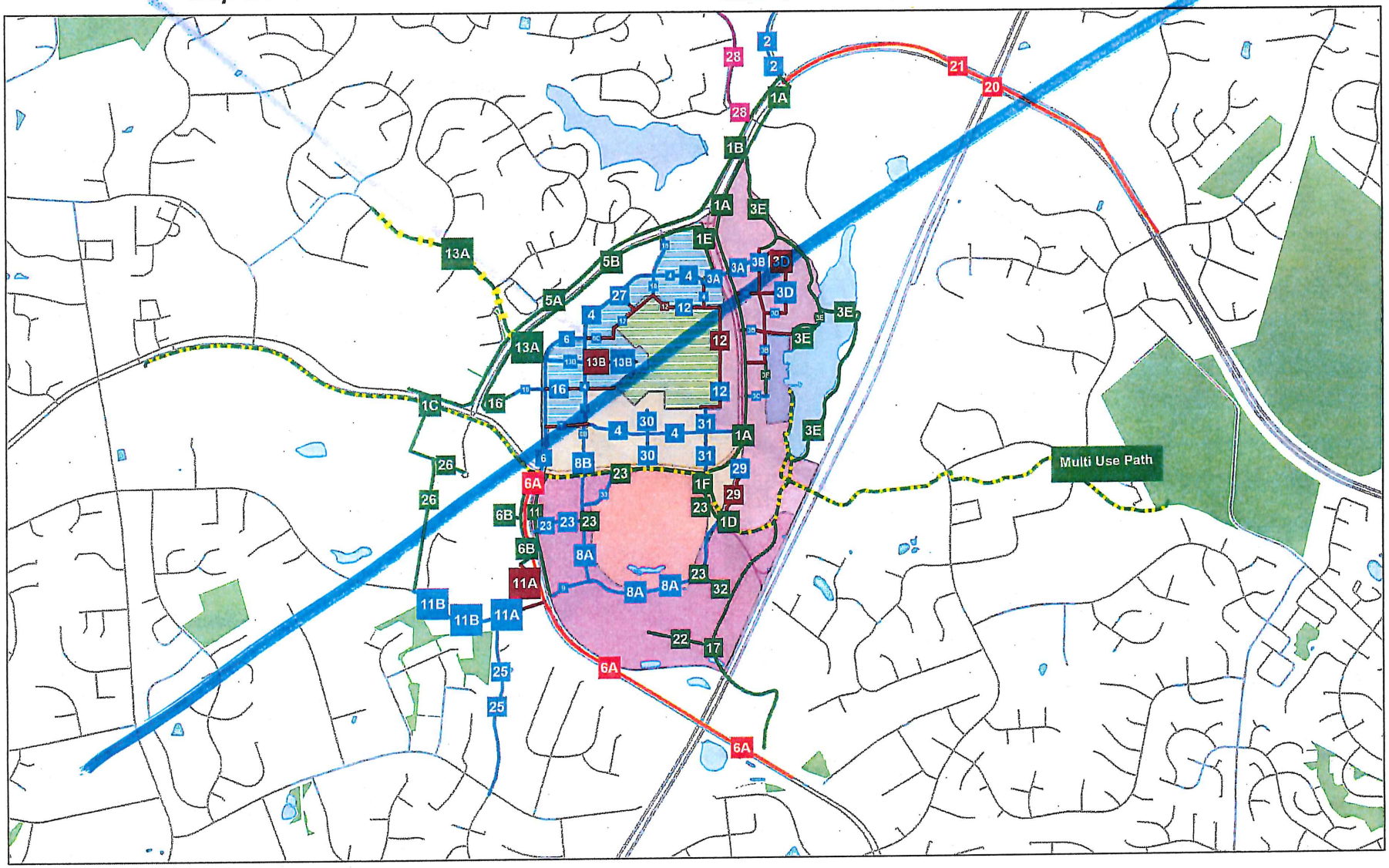
- New bicycle overpasses of major highways
- Many of the more costly cycle tracks; and many of the more costly new trails
- Development of lower stress routes to destinations already served by variable stress routes
- Upgrades of variable stress facilities implemented in the Short-Term or Mid-Term to low stress facilities

Table 2: Summary of Recommendations

Bikeway Facility Type	Network (Miles)			Total (Miles or Locations)
	Short-Term	Mid Term	Long Term	
On-Road Bikeway Improvements				394 mi.
Minor Upgrades to Existing Facilities	2	12	15	29
Recommendations for New Facilities	70	148	147	365
New and Upgraded Path/Cycletrack or Protected Bike Lanes				160 mi.
Upgrade Existing Pathways	13	14	10	37
Construct New Shared Use Paths & Protected Bike Lanes	10	21	91	122
Spot Improvements				191 Locations
Trail Access and Bike Linkage Improvements	12	17	5	34 Locations
Bridge and Tunnel Improvements (new and upgrades)	1	7	18	26 Locations
Intersection Improvements	33	74	24	131 Locations

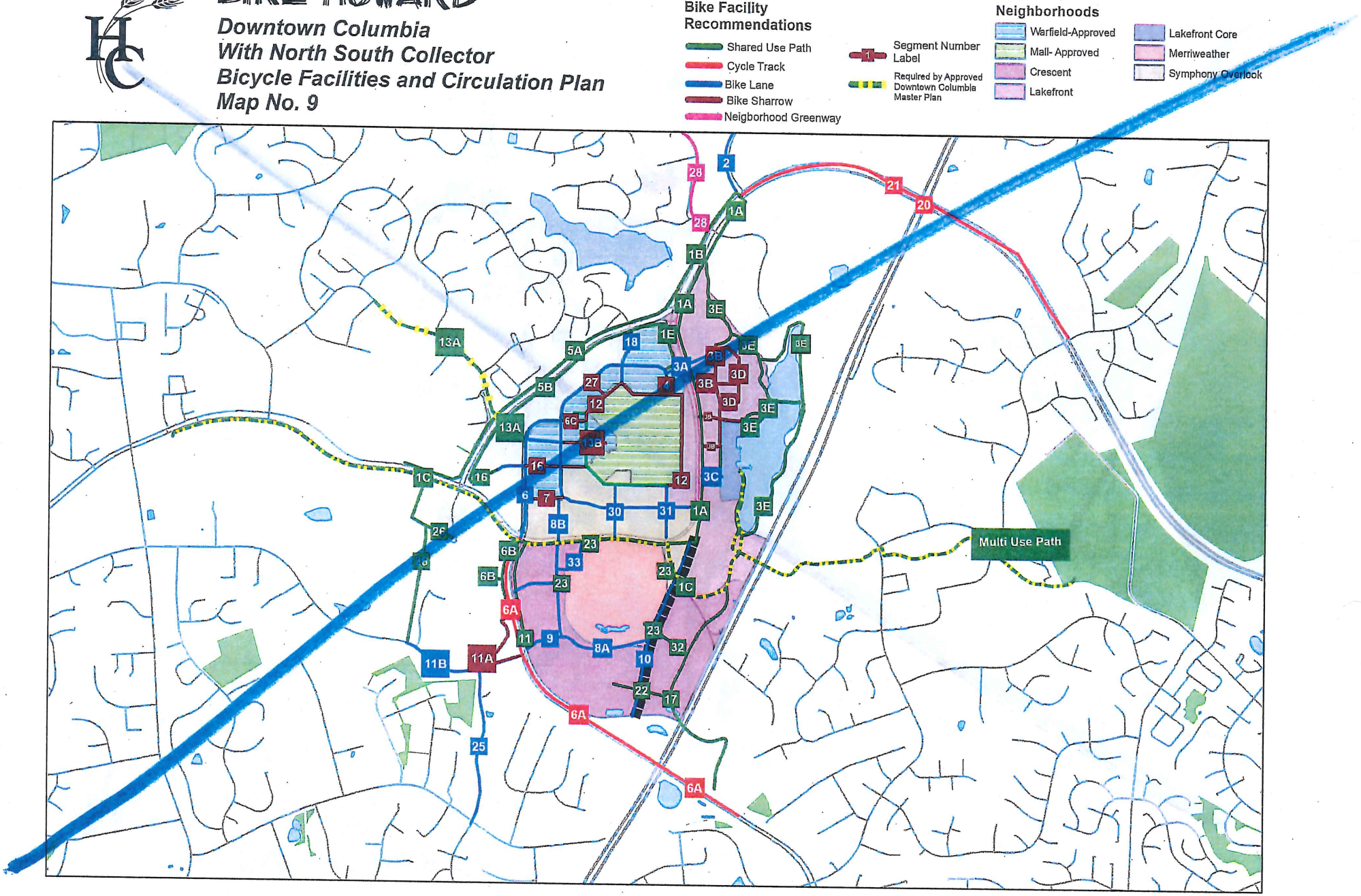
BIKE HOWARD

Downtown Columbia Without North South Collector Bicycle Facilities and Circulation Plan Map No. 8



BIKE HOWARD

Downtown Columbia With North South Collector Bicycle Facilities and Circulation Plan Map No. 9



Implementation

As BikeHoward was being developed in 2012-2015, the implementation of bicycle facilities was underway. This chapter presents a framework to enable the County to keep the process going and intensify its efforts. The framework is based on a set of key components needed to ensure a well-integrated approach to implementing projects, programs and policies. These components play complementary roles in achieving plan goals.

- Network Implementation
- Building Institutional Capacity
- Capital Project Prioritization
- Funding Strategies
- Inter-Agency Coordination

A discussion of each of these topics is provided, followed by recommendations where appropriate.

Network Implementation

BikeHoward recommends implementing the bikeway network by focusing the County's efforts on developing structured projects and leveraging opportunities.

Structured Projects in the Short-Term Network

BikeHoward developed 49 structured projects comprised of a series of facility improvements along a specific route that are bundled together to create seamless, intuitive, safe and useful connections. Structured projects are expected to be implemented over a 10 year period through the county's capital improvement program and/or coordination with SHA and CA, as appropriate. Funding support is expected to come from a variety of sources, including County, State, Federal and developer funds.

Structured projects will develop useful travel corridors to connect the core of the county. The cost estimates for structured projects use planning level construction cost estimates, design and engineering cost factors, but do not include any land acquisition costs or permitting fees. Final project costs will be dependent on more detailed analysis during facility design. For additional detail on the costs, please see Appendix L.

The structured projects also include cost estimates for wayfinding, however design and installation of wayfinding is undertaken on a route by route basis. The costs presented are based on a per mile cost and only serve as guidance.

The facilities within a structured project may be comprised of an off-road recommendation, such as a shared use path, an on-road recommendation, such as a bike lane, and/or a spot improvement. A Structured Project may combine construction of new facilities as well as upgrading existing facilities.

A summary of the structured projects is presented in Table 5 along with Map No. 10 outlining the scope of the 49 structured projects. Detail on each structured project is then presented in a series of detail sheets.

Recommendation: *Complete the structured projects in the Short-Term Network in the 10 years following adoption.*

Opportunities

Opportunities to implement BikeHoward projects will typically arise in four ways.

1. The annual scheduling of County Road resurfacing projects. While resurfacing schedules are generally based on pavement quality and typical pavement life, specific segments of road are typically identified for resurfacing on an annual basis about 4-6 months prior to the beginning of the paving season.

It is important that this process begin to take into account the implementation needs of the Short-Term Network as well as the BikeHoward Plan overall.

Recommendation: *Annually, the County shall conduct a detailed review of the on-road bikeways in the Bikeway Network and implement recommended projects. The projects selected should be based upon continuity with existing facilities and consideration of the required actions and estimated level of effort as identified in the BikeHoward GIS data. As with all public works projects, field verification of projects identified in a master plan process is necessary prior to implementation.*

2. The opportunity for the County to implement recommendations through the development process—sometimes through a requirement, or through a request.

Recommendation: *When development applications are filed, staff within DPZ should be assigned the task of identifying BikeHoward plan recommendations that may be related to the development.*

3. Through routine County work to address neighborhood traffic calming applications, traffic signal management, and other traffic management and safety needs at intersections, including crosswalk installation and maintenance, curb ramp retrofits, and installation of curb extensions.

Recommendation: *Ensure that bicycle accommodations and safety features, especially those identified in BikeHoward, are incorporated into traffic calming, intersection, crosswalk, curb extension and traffic signal projects as a routine part of evaluation and design.*

4. The opportunity to relate to activities undertaken in response to the first three opportunities. Improvements undertaken through an opportunity such as 1-3, while contributing to the Network, can end up being disconnected from it due to the limits which must be set for project boundaries. To extend an improvement with some type of action that gives the bicyclist a sense of continuity will have tremendous safety, practicality and public relations benefits, however this also may require additional funding beyond that set aside for the work that is within project boundaries.

Recommendation: *Allocate 15 percent of BikeHoward's implementation funding to an opportunity project fund to ensure the short-term utility of the investments realized by repaving, intersection upgrade and private redevelopment projects.*

Building Institutional Capacity

To begin implementation of BikeHoward two special initiatives are needed to create a solid foundation for development of the network.

Bicycle Route Sign Protocol and Manual

The proposed signage system discussed in Chapter 6 needs to be fully developed and agreed to by stakeholders. Graphic designs, color schemes, and implementation strategies need to be discussed and agreed upon, then documented in a Sign Protocol and Manual.

Recommendation: *Consider developing a sign Protocol and Manual that is agreed to by all stakeholders, including CA, DRP, DPW, DPZ, and SHA.*

Bikeway Design Training

Because Howard County has not developed a significant number of on-road bikeways, traffic engineering and roadway design staff do not have extensive experience integrating bicycle facilities into the various roadway types that the County builds and maintains.

Recommendation: *Prior to developing County-specific Bikeway Design Guidelines, thoroughly train existing traffic engineering and design staff (as well as consulting engineers) using existing curriculum related to the AASHTO Guide for the Development of Bicycle Facilities, and other national and state engineering guidance documents. Conduct four training courses in the year following plan adoption and continue with an annual training program as needed.*

Recommendation: *Ensure the County has adequate engineering and design capacity through the use of on call design firms.*

Recommendation: *Participate in study tours to visit with officials of other jurisdictions to learn about bicycling facility design and implementation best practices.*

Annual Capital Project Prioritization

Prioritizing capital projects is an activity that County agencies undertake annually. Related to the bikeway projects in the Plan, there are a number of tasks in this process for which the County should develop routine practices, including the following:

- Setting a dollar amount, or level of effort description, to determine which bikeway projects should be implemented as major capital expenditures
- Determining which bikeway projects should be integrated into roadway projects that are on the capital project list, or likely to be added to the list
- Determining which bikeway projects should be in the capital budgets of other County agencies, such as Recreation and Parks, Schools, Transit, Public Works, Libraries, etc
- Determining which bikeway projects should be recommended to the State for inclusion in the Consolidated Transportation Program.

To manage implementation of small and medium sized bikeway projects, many jurisdictions establish an on-going Bicycle Infrastructure Funding Program, for which a lump sum is budgeted each year. Selection of the specific projects to fund annually can be done through an inter-agency coordination group that is managing implementation of the BikeHoward Plan. This method keeps funding flexible and thus can be used to respond to new opportunities, critical needs that were not foreseen in the planning process, and the opportunity projects that are implemented as a part of routine work by County agencies.

Recommendation: *Annually, determine and develop projects for inclusion in the County's capital budget. Continue to ensure that the capital budget line item for BikeHoward projects maintains a fund balance of at least $750,000 per year.*

Funding

Determining how to fund various bikeway improvements is a key strategic issue that communities face when implementing bikeway master plans. While there are many funding options, each source may have limitations making it more appropriate for certain types of bikeway improvement projects.

Some funding sources are targeted to infrastructure, some to safety, education and encouragement efforts. Some sources are not directly bicycle-related but can be applicable to a bikeway project due to its nexus with another public priority such as historic preservation or public health. Some sources may support grants of hundreds of thousands or millions of dollars, other may be targeted to smaller amounts and require citizen volunteers or community involvement.

A wide range of funding options are available to Howard County, (see Table 6 for highlights). For a full discussion and additional details about funding a bikeway project or program please see Appendix M.

Recommendation:

- *Identify dedicated annual funding in the Department of Recreation and Parks and HC Public Schools for implementation of the BikeHoward Plan*
- *Identify dedicated annual funding for County Agencies to use as matching funds for grant applications including to match state and federal transportation funds and other grant programs*
- *Identify dedicated funding for ongoing maintenance of pavement markings and signage, bike parking facilities and County trails*
- *Ensure that the County is a regular applicant for key funding programs such as Transportation Alternatives, Safe Routes to School, Maryland Bikeways Program, Congestion Mitigation and Air Quality Improvement Program (CMAQ), and Recreational Trails*

Interagency and Inter-Jurisdictional Coordination

Effective implementation of BikeHoward will require ongoing coordination among a significant number of county agencies and other entities.

Recommendation: *Consider establishing a BikeHoward Implementation Team (BMP), chaired by a senior staffer from the county administration, that meets regularly (monthly or bi-monthly) to which each individual agency can report its progress.*

This group should be comprised of DPW, DPR, HCPSS, CA, DPZ, and OOT staff directly tasked with developing bicycle infrastructure in the county. This group will stay apprised of funding opportunities and monitor grant application deadlines and can also be used to resolve any conflicts that may arise.

Recommendation: *Consider establishing protocols for coordination with neighboring counties; private railroads (CSX) and utilities (BGE and others); state agencies such as State Highway Administration, Maryland Transit Administration, Maryland Department of Transportation, and the Maryland Department of Natural Resources; and Federal agencies such as the National Security Administration and other Defense Department agencies that are located in or near the county.*

How Projects Can Cost Less Than Forecast

The project cost estimates in BikeHoward are based on known and unknown factors that influence the estimates. Some factors can be clearly identified and incorporated into the cost estimates, while others cannot be. Therefore BikeHoward sometimes has to assume the worst case cost scenarios when developing estimates. Some examples of these unknown factors are the relationships between the project and the county repaving schedule, road improvements, and utility work. For BikeHoward, the most critical relationship is the repaving schedule. Since BikeHoward cannot forecast the repaving schedule, Bikehoward's estimates have to assume that a bike lane will have to be developed as a standalone project, the most costly scenario. However, when part of a project can be incorporated into a repaving project, costs can be significantly lower.

One example of this relationship to lower costs is Structured Project No. 63. This project calls for a shared use pathway connection from South Entrance Road following a corridor along the Little Patuxent River up to Stevens Forest Road, then transitioning to a bike lane on Stevens Forest Road to connect with Broken Land Parkway. The Stevens Forest Road bike lanes were estimated at $40,000, however because a portion was able to completed when the road was repaved, the new bike lanes were installed for $3,880.

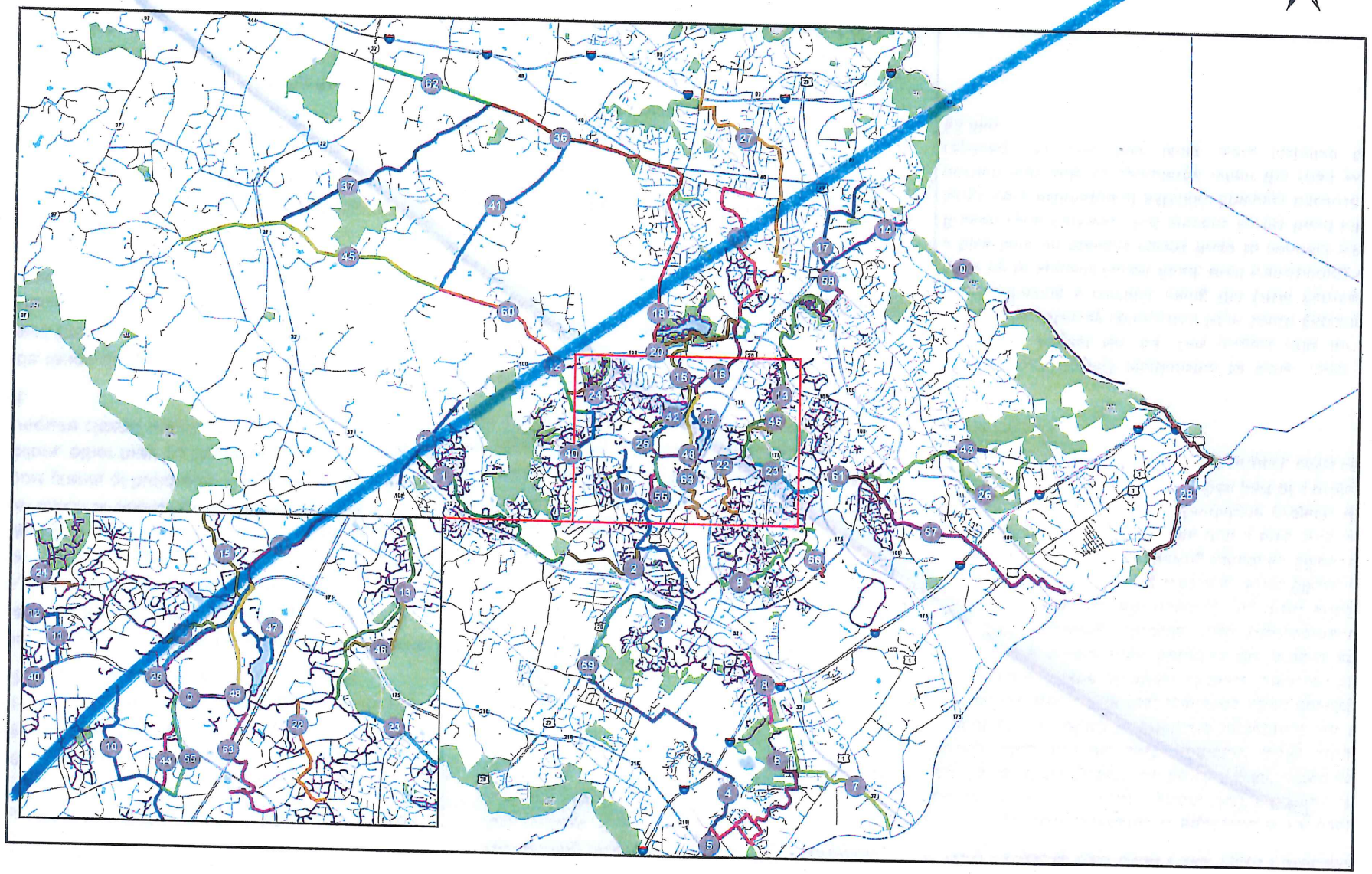
Bike Howard

Structured Projects
Map No. 10

Structured Projects-Line colors are used to show each structured project)

Existing Pathways and Trails (HC, CA and Others)

N



Spot Improvements by Network

Bike Howard ID Number	Recommended Facility Improvements	Action	Network	Location
199	Signal Improvement	Construct New	Short Term	Frederick Rd. (400 ft. East of Main St.)
1	Trail Access	Construct New	Short Term	Seneca Dr. @ Wesleigh Dr.
104	Trail Access	Construct New	Short Term	Ridings Way (260 ft. South of Lawson Ln.)
140	Trail Access	Construct New	Short Term	Trail Access at Wild Filly Ct.
202	Trail Access	Construct New	Short Term	Farewell Rd. (250 ft. East of Woodblock Rd.)
22	Tunnel	Existing	Short Term	Oakland Mills Rd. (350 ft. North of Downdale Pl.)
112	Tunnel	Existing	Short Term	Tunnel @ Rt. 175 near Cloudleap Ct.
113	Tunnel	Existing	Short Term	Whiteacre Rd. @ Thunder Hill Rd.
114	Tunnel	Existing	Short Term	Mirrorlight Pl. @ Thunder Hill Rd.
115	Tunnel	Existing	Short Term	Rt. 175 Tunnel between Old Deep Ct. and Bluecoat Ln
117	Tunnel	Existing	Short Term	Along Tamar Dr. (320 ft. East of Phelps Luck Dr.)
12	Bike Link	Upgrade Existing	Mid Term	Baltimore National Pike @ Governors Run
24	Bike Link	Construct New	Mid Term	On Old Columbia Rd. adjacent to Rivers Edge Rd.
63	Bike Link	Construct New	Mid Term	Wegmans on McGaw Rd.
73	Bike Link	Construct New	Mid Term	Medical Pavilion Parking Lot to Campus Dr. @ HCC
99	Bike Link	Construct New	Mid Term	100 ft. North of Rt. 216 and East of Maple Lawn Blvd.
100	Bike Link	Upgrade Existing	Mid Term	Bike link 270 ft. East of West Running Brook Rd.
180	Bike Link	Construct New	Mid Term	Along Rt. 97 by Misty Meadow Stables
72	Bridge	Construct New	Mid Term	North of Rivulet Row @ Green Mountain Circle
74	Bridge	Construct New	Mid Term	Rt. 175 between Tamar Dr. and Thunder Hill Rd.
106	Bridge	Construct New	Mid Term	Bridge access over Hammond Branch (1350 ft. East from Stephens Rd.)
134	Bridge	Construct New	Mid Term	Broken Land Pkwy. Bridge (1100 ft. South of Cradlerock Way)
135	Bridge	Construct New	Mid Term	Bridge that is 800 ft. North of Patuxent Woods Dr.
192	Bridge	Construct New	Mid Term	Bridge 425 ft. North of Grace Dr. on Cedar Ln.
198	Bridge	Construct New	Mid Term	Oella Ave. @ Frederick Rd.
18	Mid Block Crossing	Construct New	Mid Term	Columbia Rd. @ Plumtree Branch
57	Mid Block Crossing	Construct New	Mid Term	Cooks Ln. @ Old Columbia Pike
71	Mid Block Crossing	Construct New	Mid Term	Twin Rivers Rd. @ Harpers Farm Rd.
88	Mid Block Crossing	Construct New	Mid Term	EB Johns Hopkins Rd. To NB Rt. 29 Ramp
101	Mid Block Crossing	Construct New	Mid Term	West Running Brook Rd. (185 ft. North of Hermit Path)
105	Mid Block Crossing	Upgrade Existing	Mid Term	Jeanne Ct. @ Gorman Rd.
169	Mid Block Crossing	Upgrade Existing	Mid Term	Rt. 216 @ Rt. 29 Ramp (Roundabout)
14	On Road Crossing	Upgrade Existing	Mid Term	Washington Blvd @ Levering Ave.
19	On Road Crossing	Upgrade Existing	Mid Term	Ten Oaks Rd. @ Clarksville Pike
20	On Road Crossing	Upgrade Existing	Mid Term	Triadelphia Mill Rd. @ Ten Oaks Rd.
23	On Road Crossing	Construct New	Mid Term	Rivers Edge Rd. @ Rt. 29
26	On Road Crossing	Upgrade Existing	Mid Term	Cedar Ln. @ Harriet Tubman Ln.
27	On Road Crossing	Upgrade Existing	Mid Term	Rt. 97 divided highway towards Monticello Dr.
28	On Road Crossing	Upgrade Existing	Mid Term	Rt. 97 @ WB I-70 to Rt. 97 Ramp (Northside)
29	On Road Crossing	Upgrade Existing	Mid Term	Rt. 97 @ WB I-70 to Rt. 97 Ramp (Southside)

Spot Improvements by Network

Bike Howard ID Number	Recommended Facility Improvements	Action	Network	Location
30	On Road Crossing	Upgrade Existing	Mid Term	Rt. 97 @ EB I-70 to Rt. 97 Ramp (Southside)
31	On Road Crossing	Upgrade Existing	Mid Term	Rt. 97 @ EB I-70 to Rt. 97 Ramp (Northtside)
34	On Road Crossing	Construct New	Mid Term	Baltimore National Pike @ Rogers Ave.
36	On Road Crossing	Construct New	Mid Term	Pine Orchard Ln. @ Baltimore National Pike
37	On Road Crossing	Upgrade Existing	Mid Term	Frederick Rd. @ Baltimore National Pike
38	On Road Crossing	Construct New	Mid Term	Vollmerhausen Rd. @ Guilford Rd.
40	On Road Crossing	Construct New	Mid Term	Area between EB Rt. 32 and Guilford Rd along Sanner Rd.
45	On Road Crossing	Upgrade Existing	Mid Term	Centennial Ln. @ Clarksville Pike
47	On Road Crossing	Upgrade Existing	Mid Term	Dorsey Run Rd. to WB Rt. 32 Ramp @ Dorsey Run Rd.
53	On Road Crossing	Upgrade Existing	Mid Term	Oak Hall Ln. @ Oakland Mills Rd.
60	On Road Crossing	Upgrade Existing	Mid Term	Dobbin Rd. @ Rt. 175
76	On Road Crossing	Upgrade Existing	Mid Term	Little Patuxent Pkwy. @ Little Patuxent Pkwy.
79	On Road Crossing	Construct New	Mid Term	Gracious End Ct. @ Oakland Mills Rd.
86	On Road Crossing	Construct New	Mid Term	North Ridge Rd. @ WB Rt. 40 to SB Rt. 29 Ramp
87	On Road Crossing	Construct New	Mid Term	Montpelier Rd. @ Johns Hopkins Rd.
92	On Road Crossing	Construct New	Mid Term	Saint Johns Ln. @ SB Rt. 29 to Rt. 103 Saint Johns Ln. Ramp
95	On Road Crossing	Construct New	Mid Term	Crossover @ Old Columbia Rd. and 60 ft. North of Rt. 29
129	On Road Crossing	Upgrade Existing	Mid Term	Washington Blvd. @ Guilford Rd.
149	On Road Crossing	Upgrade Existing	Mid Term	300 ft. South of Burntwoods Rd. along Ten Oaks Rd.
151	On Road Crossing	Construct New	Mid Term	115 ft. South of Rt. 32 Ramp on Clarksville Pike
153	On Road Crossing	Construct New	Mid Term	Governor Warfield Pkwy. @ Windstream Dr.
155	On Road Crossing	Construct New	Mid Term	South Haven Dr. @ Montgomery Rd.
156	On Road Crossing	Construct New	Mid Term	Hale Haven Dr. @ Montgomery Rd.
157	On Road Crossing	Upgrade Existing	Mid Term	Waterloo Rd. @ WB Rt. 100 to Rt. 104 Ramp
158	On Road Crossing	Construct New	Mid Term	Waterloo Rd. @ Old Annapolis Rd.
159	On Road Crossing	Upgrade Existing	Mid Term	Meadowridge Rd. @ Rt. 103 to WB Rt. 100 Ramp
160	On Road Crossing	Upgrade Existing	Mid Term	Meadowridge Rd @ Rt. 103 to EB Rt. 100 Ramp
166	On Road Crossing	Upgrade Existing	Mid Term	Whiskey Bottom Rd. @ Washington Blvd.
167	On Road Crossing	Upgrade Existing	Mid Term	Gorman Rd. @ Washington Blvd.
168	On Road Crossing	Upgrade Existing	Mid Term	North Laurel Rd. @ Washington Blvd.
172	On Road Crossing	Construct New	Mid Term	Owen Brown Rd. @ Cedar Ln.
173	On Road Crossing	Construct New	Mid Term	Dorsey Run Rd. @ Rt. 32
175	On Road Crossing	Construct New	Mid Term	Guilford Rd. @ Dorsey Run Rd.
176	On Road Crossing	Construct New	Mid Term	Eliots Oak Rd. @ Clarksville Pike
177	On Road Crossing	Construct New	Mid Term	Clarksville Pike @ Cedar Ln.
179	On Road Crossing	Construct New	Mid Term	Rt. 97 @ Burntwoods Rd.
187	On Road Crossing	Construct New	Mid Term	Lime Kiln Rd. @ Scaggsville Rd.
196	On Road Crossing	Upgrade Existing	Mid Term	Baltimore National Pike @ Marriotsville Rd.
51	Pathway Crossing	Upgrade Existing	Mid Term	Roundabout on Rogers Ave. @ Old Frederick Rd.
67	Pathway Crossing	Upgrade Existing	Mid Term	Calico Ct. @ Little Patuxent Pkwy.

Spot Improvements by Network

Bike Howard ID Number	Recommended Facility Improvements	Action	Network	Location
77	Pathway Crossing	Construct New	Mid Term	Snowden River Pkwy. @ Rustling Leaf
80	Pathway Crossing	Construct New	Mid Term	Oakland Mills Rd. @ Snowden River Pkwy.
81	Pathway Crossing	Construct New	Mid Term	Solar Walk @ Robert Fulton Dr.
83	Pathway Crossing	Construct New	Mid Term	Dobbin Rd. @ Oakland Mills Rd.
103	Pathway Crossing	Construct New	Mid Term	Foundry St. @ Gorman Rd.
107	Pathway Crossing	Upgrade Existing	Mid Term	Oakland Mills Rd. @ Old Montgomery Rd.
108	Pathway Crossing	Upgrade Existing	Mid Term	Sealed Message Rd. @ Old Montgomery Rd.
109	Pathway Crossing	Upgrade Existing	Mid Term	Tamar Dr. @ Old Montgomery Rd.
111	Pathway Crossing	Upgrade Existing	Mid Term	Footed Ridge @ Majors Ln.
122	Pathway Crossing	Construct New	Mid Term	Xovr Deep Earth Ln. - Good Hunters Ride @ Snowden River Pkwy.
123	Pathway Crossing	Construct New	Mid Term	Rt. 175 @ Waterloo Rd.
163	Pathway Crossing	Upgrade Existing	Mid Term	Dobbin Center Way @ Dobbin Rd.
170	Pathway Crossing	Upgrade Existing	Mid Term	Maple Lawn Blvd. @ Scaggsville Rd. Roundabout
171	Pathway Crossing	Upgrade Existing	Mid Term	Westside Blvd. @ Scaggsville Rd. Roundabout
42	Signal Improvement	Upgrade Existing	Mid Term	Snowden River Pkwy. @ Broken Land Pkwy.
78	Signal Improvement	Construct New	Mid Term	Broken Land Pkwy. (North to WB Rt. 32 Ramp) @ Broken Land Pkwy.
126	Signal Improvement	Construct New	Mid Term	Stevens Forest Rd. @ Broken Land Pkwy.
127	Signal Improvement	Construct New	Mid Term	Cradlerock Way @ Broken Land Pkwy. (Northside)
128	Signal Improvement	Construct New	Mid Term	Cradlerock Way @ Broken Land Pkwy. (Southside)
15	Signal Improvement	Upgrade Existing	Mid Term	Florence Rd. @ Cabin Branch Ct.
16	Signal Improvement	Upgrade Existing	Mid Term	Watersville Rd. @ Frederick Rd
50	Signal Improvement	Construct New	Mid Term	Old Frederick Rd. @ Baltimore County Line
11	Trail Access	Upgrade Existing	Mid Term	Meadowbrook Park @ Long Gate Park and Ride
44	Trail Access	Construct New	Mid Term	End of Painted Rock Rd. near existing trails
65	Trail Access	Upgrade Existing	Mid Term	Trotter Rd. @ Trotter Crossing Ln.
75	Trail Access	Construct New	Mid Term	Summer Hollow Ln. @ Billow Row
137	Trail Access	Construct New	Mid Term	Broken Timber Way @ Five Fingers Way
141	Trail Access	Construct New	Mid Term	Trail Access at Larkspring Row
201	Trail Access	Upgrade Existing	Mid Term	Landing Rd. (2500 ft. North of Montgomery Rd.)
188	Bike Link	Existing	Long Term	Broken Land Pkwy. @ Rt. 32
66	Bridge	Existing	Long Term	Cedar Ln. @ Harpers Farm Rd.
4	Bike Link	Construct New	Long Term	Trail @ Rt. 32 and Brokenland Pkwy to WB Rt. 32 Ramp
49	Bike Link	Construct New	Long Term	Nearby Snowden Square Dr. @ Commerce Center Dr.
184	Bike Link	Construct New	Long Term	Bike Link 125 ft. North of Hanover Rd. near Hi Tech Dr.
185	Bike Link	Construct New	Long Term	Bike Link 190 ft. South of Fetlock Ct.
10	Bridge	Construct New	Long Term	Rt. 29 @ WB Rt. 100 to SB Rt. 29 Ramp
21	Bridge	Construct New	Long Term	Guilford Rd. @ Murray Hill Rd. along Little Patuxent River
25	Bridge	Upgrade Existing	Long Term	Near Carroll County Line and Henryton Center Rd. trail
33	Bridge	Construct New	Long Term	Old Scaggsville Rd. @ Pilgrim Ave.
39	Bridge	Construct New	Long Term	Trail near Gorman Park @ Middle Patuxent River

Spot Improvements by Network

Bike Howard ID Number	Recommended Facility Improvements	Action	Network	Location
61	Bridge	Construct New	Long Term	Dobbin Rd. by Maryland St. Dental Association
62	Bridge	Construct New	Long Term	Dobbin Center Way @ Dobbin Rd.
84	Bridge	Construct New	Long Term	South of WB Little Patuxent Pkwy. to Governor Warfield Pkwy. Ramp
85	Bridge	Construct New	Long Term	Bridge between Columbia Crossing and Dobbin Center
97	Bridge	Construct New	Long Term	Bridge that is 125 ft. South of Hammond Pkwy.
98	Bridge	Construct New	Long Term	Rt. 29 @ Rt. 216 to NB Rt. 29 Ramp
125	Bridge	Construct New	Long Term	650 ft. South of Snowden River Pkwy. to EB Rt. 175 Ramp
136	Bridge	Construct New	Long Term	80 ft. N of Broken Land Pkwy. (W of Owen Brown Rd.)
197	Bridge	Construct New	Long Term	450 ft. East of Santa Barbara Ct.
5	Mid Block Crossing	Construct New	Long Term	Snowden River Pkwy. @ Lincoln Technical Institute
82	Mid Block Crossing	Construct New	Long Term	Robert Fulton to SB Snowden River Pkwy. Ramp
89	Mid Block Crossing	Construct New	Long Term	350 ft. North of Simpson Mill Dr. along Cedar Ln.
143	Mid Block Crossing	Construct New	Long Term	Baltimore National Pike @ Executive Center Rd. (1100 ft from Rogers Ave.)
6	On Road Crossing	Construct New	Long Term	Dorsey's Search Village Center
32	On Road Crossing	Upgrade Existing	Long Term	Hunt Club Rd. @ Washington Blvd.
43	On Road Crossing	Upgrade Existing	Long Term	Merriweather Post Pavilion Driveway @ Broken Land Pkwy.
46	On Road Crossing	Construct New	Long Term	Ten Oaks Rd. @ Linden Church Rd.
55	On Road Crossing	Upgrade Existing	Long Term	Washington Blvd. @ Ducketts Ln.
56	On Road Crossing	Construct New	Long Term	Snowden River Pkwy. @ Rt. 175
93	On Road Crossing	Construct New	Long Term	Loudon Ave. @ Washington Blvd.
94	On Road Crossing	Construct New	Long Term	Montgomery Rd. @ Washington Blvd.
119	On Road Crossing	Upgrade Existing	Long Term	Farewell Rd. @ Oakland Mills Rd.
130	On Road Crossing	Upgrade Existing	Long Term	Jenmar Rd. @ Mission Rd.
145	On Road Crossing	Construct New	Long Term	WB I-70 to Marriottsville Rd. Ramp
146	On Road Crossing	Construct New	Long Term	Marriottsville Rd. (275 ft. South of I-70)
147	On Road Crossing	Construct New	Long Term	Marriottsville Rd. (650 ft. South of I-70)
7	Pathway Crossing	Upgrade Existing	Long Term	West Running Brook Rd. @ Little Patuxent Pkwy.
64	Pathway Crossing	Construct New	Long Term	Shadow Fall Terrace @ Oakland Mills Rd.
96	Pathway Crossing	Construct New	Long Term	Coca Cola Dr. @ Hi Tech Dr.
120	Pathway Crossing	Upgrade Existing	Long Term	Sewells Orchard Dr. @ Oakland Mills Rd.
121	Pathway Crossing	Upgrade Existing	Long Term	Fairmead Ln. @ Oakland Mills Rd.
142	Pathway Crossing	Construct New	Long Term	Saint Johns Ln. @ SB Rt. 29 to WB Rt. 40 Ramp
144	Pathway Crossing	Upgrade Existing	Long Term	Woodbine Rd. @ Frederick Rd.
148	Trail Access	Construct New	Long Term	Trail Access between Elibank Dr. and Montgomery Rd.
52	Tunnel	Construct New	Long Term	Centre Park Dr. @ Rt. 100
118	Tunnel	Existing	Long Term	Along Tamar Dr. (150 ft. North of Lamskin Ln.)
133	Tunnel	Construct New	Long Term	1000 ft. South of NB Rt. 29 to Johns Hopkins Rd. Ramp
181	Tunnel	Upgrade Existing	Long Term	Brumbaugh St. @ Main St.
182	Tunnel	Existing	Long Term	Tunnel by Baltimore County Line and 3600 ft. West of I-95
186	Tunnel	Construct New	Long Term	Northside of Rt. 29 at Rt. 40

APPENDIX G

Downtown Columbia Circulation Plan

Downtown Columbia Bicycle Facilities and Circulation Plan

Number	Road or Area Name	From	To	Facility Type Recommendation	Description of Recommendation
1A	Little Patuxent Parkway (eastside leg of north/south alignment)	Columbia Road	South Entrance Road	Shared Use Path	The 10 foot shared use path will follow the eastside of Little Patuxent Parkway from Columbia Road south to South Entrance Road.
1B	Little Patuxent Parkway (westside leg of north/south alignment)	Columbia Road	Governor Warfield Parkway	Shared Use Path	The 10 foot shared use path will follow the westside of Little Patuxent Parkway from Columbia Road south and continue to the intersection of Governor Warfield Parkway and Little Patuxent Parkway
1C	Little Patuxent Parkway (south side of east/west alignment)	South Entrance Road	Governor Warfield Parkway/Banneker Road	Shared Use Path	The 10 foot shared use path will follow the south side Little Patuxent Parkway from South Entrance Road to Governor Warfield Parkway/Banneker Road. This recommendation harmonizes with HHI's multi use path.
1D	South Entrance Road	Little Patuxent Parkway	Southwest Corner of Lakefront Neighborhood Building.	Shared Use Path	The shared use path will follow the east side of the South Entrance Road from Little Patuxent Parkway and transition around the southeast corner of the Lakefront Neighborhood Building. This recommendation harmonizes with the proposed multi use path.
1E	Little Patuxent Parkway (westside of Little Patuxent Parkway at Governor Warfield Parkway)	Governor Warfield Parkway	Sterret Place	Shared Use Path	The shared use path will follow the west side of Little Patuxent Parkway.
1F	South Entrance Road	Little Patuxent Parkway	Intersection of South Entrance Road and proposed extension of Symphony Wood Road.	Shared Use Path	The shared use path will follow the west side of South Entrance Road.
2	Columbia Road	Little Patuxent Parkway	Ten Mills Road	Bike Lanes	The bike lane will follow the north bound leg of Columbia Road to Ten Mills Road. A southbound bike lane could be accommodated with by shifting pavement markings.
3A	Sterret Place	Columbia Mall Circle	Wincopin Circle Extended	Bike Lanes	Bike lanes are proposed on Sterret Place from Columbia Mall Circle to proposed Wincopin Circle extended.
3B	Wincopin Circle	Little Patuxent Parkway	Existing terminus, with extension of facilities north	Sharrows	Sharrows are proposed for the existing road and on the proposed extension to the north.
3C	Access road to Whole Foods site	Little Patuxent Parkway	Shared Use Path from Wincopin.	Bike Lane	Bike lanes are proposed for the access road to Whole Foods.
3D	Existing private access roads	Area Wide		Sharrows	Sharrows are proposed for existing and proposed access roads within the neighborhood.

Downtown Columbia Bicycle Facilities and Circulation Plan

Number	Road or Area Name	From	To	Facility Type Recommendation	Description of Recommendation
3E	Existing paths	Vantage Point Road	To Lakefront Area	Shared Use Path	Expand existing and/or proposed paths to ultimate pavement width of 10 feet.
3F	Existing open area	Existing terminus at American City Building	Access road to Whole Foods site	Shared Use Path	A shared use path will allow access to Whole Foods from the north.
4	Columbia Mall Circle	Garage entrance near Sterret Place	Symphony Woods Road (See 8B)	Bike Lane/Sharrows	Bike lanes and sharrows are proposed to provide for a path around the mall.
5A	Governor Warfield Parkway	Little Patuxent Parkway/Governor Warfield Parkway	Little Patuxent Parkway/Banneker Road	Shared Use Path	The shared use path will follow the south bound leg of Governor Warfield Parkway.
5B	Governor Warfield Parkway	Little Patuxent Parkway/Governor Warfield Parkway	Little Patuxent Parkway/Banneker Road	Shared Use Path	The shared use path will follow the north bound leg of Governor Warfield Parkway.
6	Broken Land Parkway	Little Patuxent Parkway	Columbia Mall Circle	Bike Lanes	The recommendation for this section Broken Land Parkway is to install bike Lanes. This recommendation does not harmonize with the approved plan. The approved plan does not propose any treatment, however this is an important segment of the proposed network.
6A	Broken Land Parkway	Little Patuxent Parkway	Stevens Forest Road	Cycle Tracks	The proposed two way cycle track will follow the southbound leg of Broken Land Parkway, transitioning to a cycle track in the road median at Hickory Ridge Road and continue across MD 29 to Stevens Forest Road.
6B	Broken Land Parkway	Little Patuxent Parkway	1,200 feet south of the intersection of Broken Land Parkway and Little Patuxent Parkway	Shared Use Path	The shared use path will follow the southbound leg of Broken Land Parkway and will connect to an existing path and also transition to existing private road network in the Avalon Community. The first connection will be about 600 feet from the intersection of Broken Land Parkway and Little Patuxent Parkway, in which a spur would connect the two paths. The second transition would be a diversion into the Avalon community from the right of way into the property across a landscaped area at a point about 1,200 feet from the intersection of Broken Land Parkway and Little Patuxent Parkway. The transition would connect with proposed sharrow treatment within the Avalon Community.
6C	Broken Land Parkway Extended	Columbia Mall Circle	Terminus	Sharrows	Sharrows have been approved for use.
7	Gramercy Place (Extended)	Gramercy Place	Columbia Mall Circle	Sharrows	Sharrows are proposed to connect with bike lanes on Columbia Mall Circle.

Downtown Columbia Bicycle Facilities and Circulation Plan

Number	Road or Area Name	From	To	Facility Type Recommendation	Description of Recommendation
8A	Symphony Woods Road (existing and proposed extension to Little Patuxent Parkway) Avenue Type 3.	Little Patuxent Parkway	South Entrance Road	Bike Lanes	Bike lanes will follow the road in both travel directions.
8B	Symphony Woods Road-extended	Little Patuxent Parkway	Gramercy Place (Extended)	Bike Lanes	Bike lanes are proposed for both travel directions.
9	Hickory Ridge Road (Extended)	Current terminus of Hickory Ridge Road at Broken Land Parkway	Symphony Woods Road	Bike Lanes	Bike lanes are proposed for both travel directions.
10	North-South Collector (Proposed)	Where the North-South Collector overlaps the alignment of Symphony Woods Road.		Bike Lanes	Bike lanes are proposed for both travel directions.
11	Broken Land Parkway	Little Patuxent Parkway	Hickory Ridge Road Extended	Shared Use Path	A shared use path will follow the northbound leg of Broken Land Parkway.
11A	Hickory Ridge Road	Broken Land Parkway	Intersection of Martin Road and Avalon Community access road, then into private development via access road.	Bike Sharrows	The proposed sharrows will be placed on both east and west legs of Hickory Ridge Road from the intersection of Hickory Ridge Road and Broken Land Parkway to the intersection of Hickory Ridge Road and Martin Road. In addition, they will be placed on the access road into the development.
11B	Hickory Ridge Road	Martin Road	150 feet past college square	Bike Lanes	The proposed bike lanes will be placed on both the east and west legs of Hickory Ridge Road.
12	Mall Neighborhood Street Type 3 Network	Area Wide		Sharrows	Sharrows are approved for use for use on the north and east sides of the mall building.
13A	Twin Rivers Road	Wilde Lake Village Center	Broken Land Parkway	Shared Use Path	The project aligns with the proposed shared use path being developed under CEPPA No. 18
13B	Twin Rivers Road and Twin Rivers Road Extended	Broken Land Parkway	To terminus in mall area.	Sharrows/Bike Lanes	The approved plan calls for sharrows and bike lanes.
15	Crescent Neighborhood local network (Street Type 2)				Bike lanes are included with the Street Type 2 typical section par the Downtown Columbia Design Guidance. It should be noted, however, that each developing Neighborhood to date has developed specific Design Guidance for their individual Neighborhood. Also the Road Type abdicated in the Downtown wide Design Guidance is also subject to change when that Neighborhood actually enters the development process.

Number	Road or Area Name	From	To	Facility Type Recommendation	Description of Recommendation
16	Town Center Avenue (Private Road)	Mall Access Road	Traffic circle within the development	Bike Lanes/Shared Use Path/Sharrows	The proposed bike lanes, sharrows and shared use path will be linked to enhance an existing connection to the intersection of Governor Warfield Parkway and Little Patuxent Parkway.
17	Downtown Columbia Trail/Patuxent Branch Trail Extension	Lake Kittamaqundi area and the multi use pathway	Existing Patuxent Branch Trail	Shared Use Path	This will study a new connection along the Little Patuxent River sewer alignment to Broken Land Parkway, connecting Downtown Columbia at Lake Kittamaqundi and extending south to the existing Patuxent Branch Trail.
18	Windstream Drive	Governor Warfield Parkway	Columbia Mall Circle and existing parking lots.	Bike Lanes	Bike lanes are proposed from the Governor Warfield Parkway intersection to the Mall entrances, transitioning across a parking lot.
19	Mall Alleys	Area Wide		No Recommendations	
20	MD 175/US 29 Bridge	Bridge Structure	Bridge Structure	Cycle Tracks	Cycle tracks are proposed on new bridge structures unless the existing deck structures can be reconstructed to accommodate cycle tracks. ALTERNATE: Cycle tracks are proposed for the existing but reconstructed bridge deck or a new bridge structure.
21	Little Patuxent Parkway	Columbia Road	Bridge Structure	Median cycle track	A 12 to 14 foot median cycle track is proposed from Columbia Road to the US 29 crossing. A bridge to cross a stream would be needed.
22	Crescent Neighborhood	Area Wide		Bike Lanes and Shared Use Paths	Bike Lanes are proposed for circulation on local private access roads. Grade separated Shared Use Paths are recommended to access the proposed Downtown Columbia Trail Patuxent Branch Trail Extension
23	Merriweather Wood Neighborhoods	Area Wide		Shared Use Path/Bike Lanes	Shared use paths are recommended to access the internal portions of the area without road access, bike lanes are recommended for the roads.
25	Martin Road	Hickory Ridge Road	Owen Brown Road	Bike Lanes	The proposed bike lanes would be on both the northbound and southbound sides of Martin Road.
26	New Utility Line ROW Connection	Hickory Ridge Road	HHI's multi use Path	Shared Use Path	The shared use path would use an existing utility ROW to provide a north/south connection from Hickory Ridge Road to HHI's multi use path and could also include a connection to Banneker Road.
27	Columbia Mall Circle Connection	Area Wide		Bike Sharrows	Bike sharrows are proposed to allow connections between the multi use path, Columbia Mall Circle and the Mall.

Downtown Columbia Bicycle Facilities and Circulation Plan

Number	Road or Area Name	From	To	Facility Type Recommendation	Description of Recommendation
27	Symphony Overlook Connections	Area Wide		Sharrows	Sharrows are proposed for access roads within the Symphony Overlook neighborhood
28	West Running Brook Road	Little Patuxent Parkway	Hyla Brook Road then north to Centennial Lane	Bike Lanes/Bike Sharrows	Bike lanes from Little Patuxent Parkway to Hyla Brook Road with a transition to sharrows as the road travels north.
29	Swift Stream Place	Little Patuxent Parkway	South Entrance Road	Bike Sharrows	Sharrows will provide for access to the multi use path for the community.
30	Connector Road	Little Patuxent Parkway/HHI multi use path	Columbia Mall Circle	Bike Lanes	Bike lanes are proposed to provide a high quality connection to the multi use path and symphony woods from the mall area.
31	Symphony Overlook Connections	Southeast corner of mall building	South to Little Patuxent Parkway and HHI's multi use path.	Bike Lanes	Bike lanes are proposed from the southeast corner of the mall south to connect to HHI's multi use path, providing a high quality connection.
32	Symphony Woods Connections	Symphony Woods Road	Little Patuxent Trail Extension	Shared Use Path	Shared use path proposed to connect to HHI's multi use path.
33	Merriweather Woods Proposed Road	Little Patuxent Parkway	Symphony Woods Road (existing and proposed extension to Little Patuxent Parkway) Avenue Type 3.	Bike Lanes	Bike lanes are called for on the proposed road.

BIKE HOWARD

Downtown Columbia Without North South Collector Bicycle Facilities and Circulation Plan Map No. 8

Bike Facility Recommendations

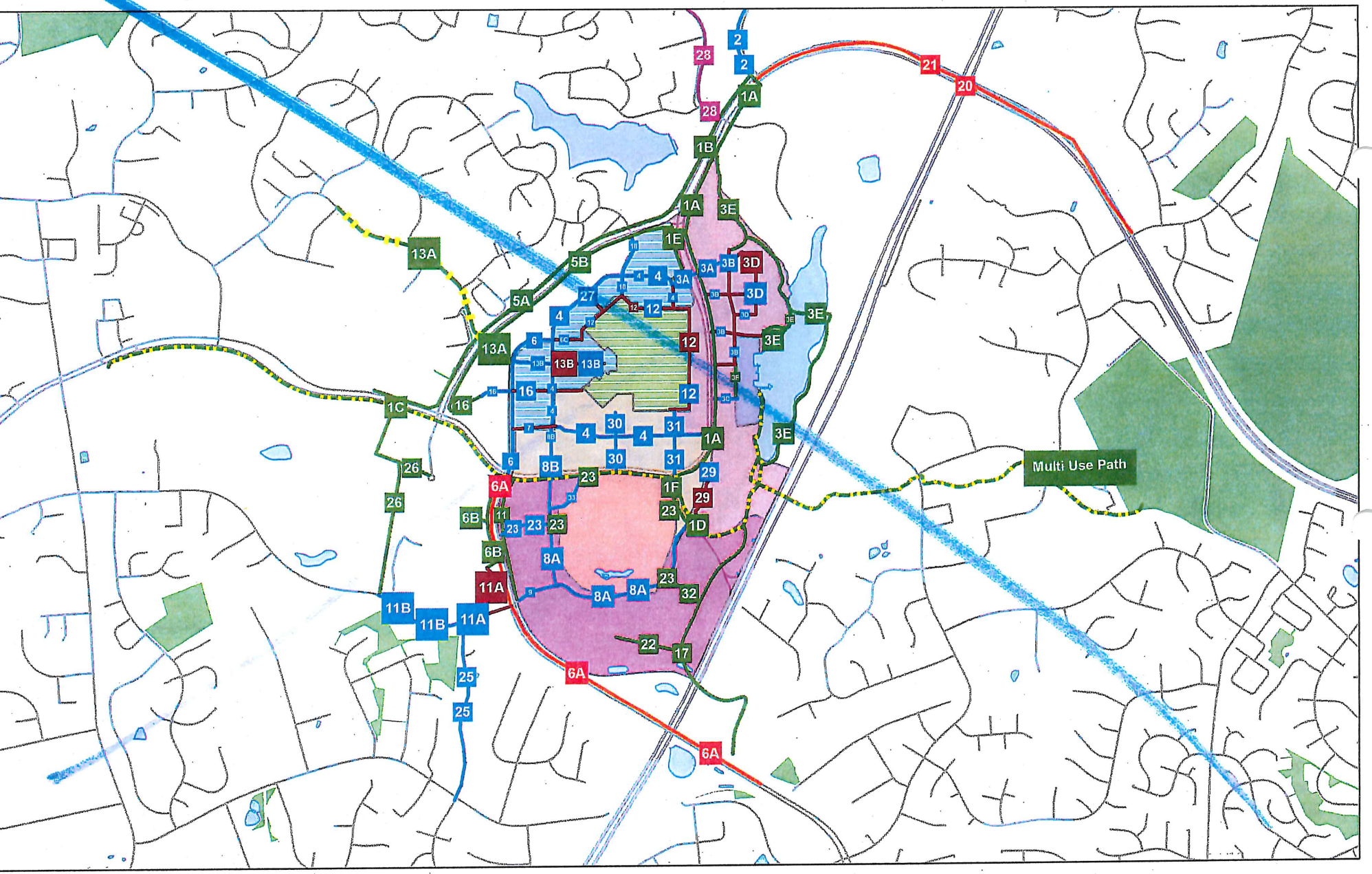
- Shared Use Path
- Cycle Track
- Bike Lane
- Bike Sharrow
- Neigborhood Greenway

Segment Number Label

Required by Approved Downtown Columbia Master Plan

Neighborhoods

- Warfield-Approved
- Mall- Approved
- Crescent
- Lakefront
- Lakefront Core
- Merriweather
- Symphony Overlook



BIKE HOWARD

Downtown Columbia With North South Collector Bicycle Facilities and Circulation Plan Map No. 9

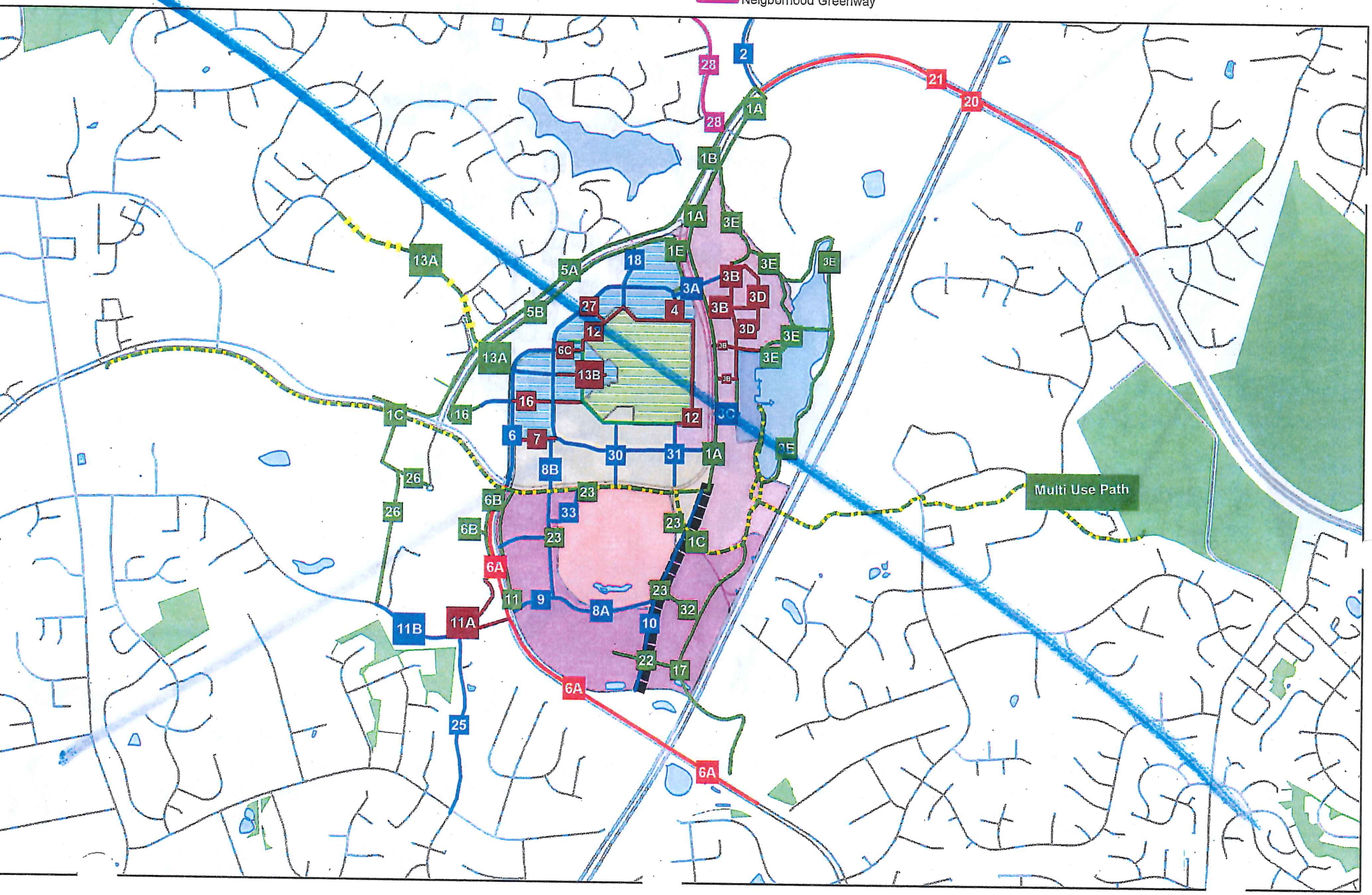
Bike Facility Recommendations

- Shared Use Path
- Cycle Track
- Bike Lane
- Bike Sharrow
- Neigborhood Greenway

- Segment Number Label
- Required by Approved Downtown Columbia Master Plan

Neighborhoods

- Warfield-Approved
- Mall- Approved
- Crescent
- Lakefront
- Lakefront Core
- Merriweather
- Symphony Overlook



Amendment 5 to Council Resolution No. 35-2016

BY: The Chairperson
at the request of the County Executive
and cosponsored by Calvin Ball

Legislative Day No. 4
Date: April 4, 2016

Amendment No. 5

(This amendment adds a note to reference the Downtown Columbia Bridge Feasibility Study.)

On page 24 of the Bicycle Master Plan, attached to the Resolution as Exhibit A, in Table 2, titled "Summary of Recommendations" in the column titled "Bikeway Facility Type", after "Bridge and Tunnel Improvements (new and upgrades)", insert "*".

At the bottom of the page, insert:

"* In addition, the existing bicycle and pedestrian bridge over Route 29 between Downtown Columbia and Oakland Mills was the topic of the 2015 "Downtown Columbia Bridge Feasibility Study". www.howardcountymd.gov/Departments/County-Administration/Transportation/Transportation-Projects. The study evaluated several options to modify the existing bridge or build a new bridge to accommodate transit in addition to improving bicycle and pedestrian traffic.".

Amendment 6 to Council Resolution No. 35-2016

BY: The Chairperson
at the request of the County Executive

Legislative Day No. 4
Date: April 4, 2016

Amendment No. 6

(This amendment adds a tracking and reporting recommendation, and clarifies the process for amending the Bicycle Master Plan, as well as proposes a potential public input process.)

On page 52 of the Bicycle Master Plan, attached to the Resolution as Exhibit A, before the sub-section titled, "Building Institutional Capacity", insert:

"*Network Improvement Implementation Process*

The structured projects in BikeHoward depict implementation projects at "planning level" detail that gives sufficient information to convey the route and type of project that is contemplated, but still allows for modifications, based on additional study, design and engineering and public input. Modifications that are generally consistent with the project as described in the Plan would not require a Plan amendment. Modifications that the Office of Transportation deems significant would require a County Council-approved Plan amendment, or approval through another public process such as the Capital Budget process that includes County Council approval.

At the request of the Planning Board, Section 10 of the Plan (Implementation Matrix) was amended to state that a public process for implementation of structured projects will be developed within two years. The following table recommends a framework for this public process:

Network Improvement Project Mechanism	Network Improvement Examples	Public Input Process
Resurfacing project	Striping roadway with bicycle lanes, shared lane markings (sharrow)	Public meeting by OoT if on-street parking would be removed, or if vehicular travel lane patterns would change significantly.
Development Process (e.g., rezoning, subdivision, special exception, site development plan)	Portion of BikeHoward structured project (bicycle lane, portion of off-road path, spot road widening) connection between neighborhoods.	Bicycle improvement discussed/addressed as part of Department of Planning and Zoning notice, review, and approval process.
Capital Project		
Minor (for example, a curb ramp project, crosswalk, or traffic signal modifications).	Traffic signal detection for cyclists, shared lane markings, wider than standard curb ramp	Public meeting by OoT if on-street parking would be removed, or if vehicular travel lane patterns would change significantly.
Major	Standalone BikeHoward structured project or structured project being implemented in association with, for example, a major road improvement, water and sewer project, park or public school.	1. Project will be reviewed with the Bicycle Advisory Group, as well as discussed at the annual BikeHoward Open House. 2. Project will be listed in the Capital Budget and follow the Capital Budget Public Input Process. 3. Project will have a page on bikehoward.com with all associated project documents, and a summary of public comments with responses. 4. Public meetings at 30% and 90% design stages before construction.

"

On page 53 of the Bicycle Master Plan, attached to the Resolution as Exhibit A, after the second recommendation of the sub-section titled, "Interagency and Inter-Jurisdictional Coordination", insert a new sub-section titled, "Tracking and Reporting". Under the new sub-section heading, "Tracking and Reporting", insert:

"In order to encourage involvement by the entire community and continue to be transparent and open in implementing the recommendations of this Plan, a process should be outlined to track the progress of implementation, as well as continue to solicit public input.

***Recommendation**: The Office of Transportation should host an annual, public BikeHoward Open House each winter. At these events, the Office of Transportation should provide updates on the progress of BikeHoward implementation and should solicit feedback on past implementation as well as solicit input regarding future projects and grant applications.*

Recommendation: *The Office of Transportation should produce and disseminate an annual BikeHoward Implementation Progress report to the County Executive and the County Council, as well as post it publicly on the BikeHoward website.*

Recommendation: *The Office of Transportation should comprehensively review the Bicycle Master Plan every five years and recommend changes for approval by the County Council.*".